

A LONGITUDINAL ANALYSIS OF READING AND ARITHMETIC
ACHIEVEMENT AND COURT-ORDERED DESEGREGATION
(WITH "FORCED" BUSING) IN A LARGE URBAN SCHOOL DISTRICT
IN THE SOUTH

By

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To
Granny
and
To
Gene

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Abstract of Dissertation Presented to the Graduate Council
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This study investigates, under conditions of court-ordered desegregation accomplished by "forced" busing, the assumption that desegregation brings achievement gains for blacks while at the very least having no negative effects on white achievement. Reading and arithmetic achievement (as measured by the Paragraph Meaning, Word Meaning, Language, Arithmetic Computation, and Arithmetic Concepts subtests of the Stanford Achievement Test, 1963 ed.) of a sample of 429 upper elementary students (102 black males, 106 black females, 110 white males, 111 white females) in Jacksonville, Florida is the focus of this investigation. The sample is of low ability, achievement, and estimated family income and appears representative of the population.

Subjects were desegregated by court-ordered busing at the beginning of the fourth grade in 1972. An appropriate control group is not available; thus, a single-group longitudinal design is used. Null hypotheses concerning longitudinal achievement patterns across grades three through five are formulated in terms of year-one and year-two achievement slopes and are tested with the t statistic.

National percentile scores are gathered on each subject at the end of grade three (the year prior to desegregation). Percentile scores are converted to z -scores and group means are calculated and used to compute t -ratios. Since evaluation of each null hypothesis requires multiple t -ratios, an overall test to reduce Type I error is utilized.

When Language is excepted, blacks show large increases in reading achievement during the first year of desegregation, and whites show generally stable levels of achievement. However, both black males and whites show anomalous declines in Language. While it appears that Language does not measure reading as such, these results are nonetheless interesting, leading to the speculation that desegregation brings less instructional emphasis on language for black children. In arithmetic achievement, blacks again show increases, but whites show very large declines. Examination of achievement patterns also reveals that the achievement of black females appears to be less susceptible to manipulation than is that of black males.

Based on these results, it is concluded that the assumption that desegregation brings black achievement gains is confirmed, while the assumption that white achievement is unaffected is not. Whites do show stability in reading but decline dramatically in arithmetic achievement. Given the weaker internal validity of the single-group design and the possibility of unknown bias stemming from the change in achievement test forms across grade levels, this conclusion must be drawn with caution. Further generalizability is limited by the nature of the sample to upper elementary students of low average ability, relatively low academic performance, and low estimated family income level in the urban south.

This study leaves unanswered the question of whether these findings are due to changes in the type of school peers and level of proportion white experienced by each race, i.e., a classroom peer composition effect, or to the general systemic disruption of the first year of desegregation, i.e., a trauma effect. Further, a cursory examination of Paragraph Meaning and Arithmetic Computation data for aptitude-treatment interaction show that such interaction is indeed present and that first quartile whites and blacks have strikingly similar achievement patterns. This suggests that a teaching/instructional effect may be the root cause of the observed black gains and white losses. Future research should concentrate on determining whether

the trauma, classroom peer composition, teaching/instructional effect or some combination of the three is operating. In addition, black and white Language achievement and the differences between black males and black females in sensitivity to factors affecting achievement should also be investigated.

CHAPTER I

THE PROBLEM

Introduction

In 1954 the United States Supreme Court outlawed racial segregation of schools with the historic Brown v. Board of Education of Topeka decision. By the mid-1960's, Brown had led to widespread voluntary desegregation, i.e., change from dual to biracial or multiracial education, of both school districts and schools throughout the Northern, Western, and Border States. In the South, however, Brown had done little more than strike segregation clauses from the state constitutions and statute books. In the few Southern school districts where desegregation had actually occurred, it had generally been imposed by court order and involved small numbers of students. Southern School News (1965) reports that as late as the 1964-1965 school year, only 17% of all blacks actually attending school with whites in the 18 Southern and Border states were in the 11 Southern states, although 85% of the region's black students were enrolled there. While 88% of the public school districts in the South itself had both blacks and whites enrolled, only 35% of these had actually

desegregated. Forty-eight percent of these desegregated districts were in a single state, Texas, which had desegregated voluntarily. Most of the desegregation in the remaining 10 Southern states had been accomplished through court order. Only four of these had experienced any voluntary desegregation, and that usually one jump ahead of the court. Throughout most of the South, dual school systems had simply continued to operate, and de facto rather than de jure segregation had become the order of the day.

It was this persistent Southern resistance that led Congress to pass the Civil Rights Act of 1964, which, by providing the basic legal tools necessary to eliminate segregation, began the massive efforts of the late 1960's to disestablish the dual school districts of the South and laid the foundations for the efforts of the 1970's to desegregate schools throughout the nation. Mosteller and Moynihan (1972) report that by the fall of 1970, the courts and various federal agencies had desegregated 97% of the school districts in the South. The remaining 3% were either involved in litigation or negotiations or were subject to U.S. Department of Health, Education, and Welfare (HEW) administrative proceedings or litigation. Some 90.5% of the South's black school children were now in desegregated school systems, in contrast to 4.3% in the fall of 1967. Most of this

desegregation had come virtually overnight, for in the fall of 1969 only 27.2% of the South's black school children were in desegregated districts.

As the dual systems of the South were eliminated, however, it became apparent that the elimination of the dual school system did not automatically mean the elimination of the racial identity of the schools themselves, i.e., the end of all-black or all-white schools. Between 1968 and 1970, the proportion of black children in the 11 Southern states in desegregated school districts rose approximately 86.2%, yet the proportion of black children actually attending majority white schools rose only 20.6%, from 18.4% in 1968 to 39.0% in 1970 (Mosteller and Moynihan, 1972). Further, during this same period virtually no changes occurred in the 32 Northern and Western states, which had 27.6% of their black students in majority white schools in 1968 and 27.7% in 1970. Thus, with the dual school system virtually eradicated, around 1970 the desegregation effort began to concentrate on the elimination of school racial identity. Ammunition for this effort was provided by Supreme Court decisions requiring the utilization of busing to end racial segregation.

The past five years have seen evidence of the gathering momentum of this new thrust, which, while initially directed at the schools of Southern cities such

as Charlotte, Mobile, Miami, and Jacksonville, has since 1973 focused on the schools of Northern, Western, and Border cities such as Detroit, Denver, Boston, and Louisville. Given the experiences of these cities, particularly the latter four, it appears that desegregation is increasingly following the Southern pattern of the late 1960's and early 1970's, rather than that of the Northern, Western, and Border regions in the 1950's and early 1960's. Desegregation now appears to come in the face of strong opposition and by court order rather than voluntarily. Additionally, because it seeks the desegregation of the schools themselves rather than that of the school district and therefore must transport pupils to achieve racially balanced student populations within schools, desegregation appears to be inextricably interwoven with extensive court-ordered or "forced" busing. Since the national consensus (as articulated by the courts and various federal agencies) seems to be that the desegregation of the schools themselves should now be pursued, common sense anticipates that this "new desegregation" will be characteristic of the future.

Problem

The basic rationale and much of the social energy for the massive desegregation effort of the past twenty years are rooted in the axiom (explicitly stated in

Brown) that segregation per se is harmful to children in a variety of ways. From the beginning, it has been tacitly assumed by virtually everyone that among the most harmful effects are inherent educational deprivation of segregated black children and a consequent depression of their academic achievement levels. This virtually unquestioned assumption led early to the assertion that desegregation would raise black achievement levels. A corollary assertion, made initially in response to Southern protests that desegregation would harm whites, is that the academic achievement of whites would not decline with desegregation. In short, the assumption that desegregation raises black achievement levels while at the very least having no negative effects on white achievement levels entered the conventional wisdom of the 1950's and 1960's unchallenged (Cohen, 1974).

Surprisingly, however, "hard" support for such an assumption is virtually nonexistent. The Brown case itself is based on studies of the relationships between segregation and inequality and segregation and psychological harm (Armor, 1972; St. John, 1970) which offer no direct comment on the relationship between desegregation and academic achievement. As desegregation has progressed through the 1960's and research has accumulated (almost nonchalantly), black gains have not materialized as expected. To date, the preponderance of the research

on desegregation and academic achievement (which has been conducted largely in Northern and Western cities that voluntarily desegregated during the mid- and late 1960's) indicates a trend toward only slight increases in black achievement. In many cases blacks showed no change at all (Cohen, 1974; St. John, 1970; Armor, 1972; Pettigrew, Useem, Normand, and Smith, 1973). Whites, who have not been the focus of the research, generally showed no change.

In addition, this research generally is confounded by several factors which could account for these results. First, due to the nature of the various desegregation programs, there is usually a selection factor operating for blacks that precludes even approximate equivalency of desegregated and segregated black comparison groups. The desegregated blacks are usually of higher ability and/or achievement motivation than the segregated blacks. Second, the selected desegregated blacks are often transferred from ghetto schools to suburban schools and then compared with segregated blacks who remain in the ghetto schools. No attempt is made to compare educational programs in the segregated and desegregated schools to insure that the two groups are receiving equal treatment. St. John (1970), after comprehensively reviewing the literature (much if not most of which is

unpublished), summarizes the situation as follows,

The "before and after" studies of the desegregation of school systems or individuals suggest that following desegregation of whatever type or at whatever academic level, subjects generally perform no worse and in most instances better...but interaction between desegregation and quality of schooling has not been ruled out as the explanation of the difference... for all these studies the unresolved question is: Were the desegregated students a select group to start with? (p. 127)

Finally, it appears that "token" desegregation is typical of most of the desegregation programs studied. The ratio of desegregated blacks to whites is kept low, generally less than 15%. (Exact percentages are difficult to impossible to determine since such information is seldom explicitly stated but must be gleaned in sifting through the literature.) In summary, it seems to this researcher that "hard" support for the assumption that desegregation raises black achievement while having no negative effect on white achievement is tenuous at best, even under the conditions of voluntary desegregation typical of the 1960's.

With the advent of the "new desegregation" of the 1970's, this assumption seems even more open to question. If blacks do not show strong gains under the surely more favorable conditions of voluntary desegregation, what will happen under the hostile conditions that usually

accompany court-ordered desegregation and "forced" busing? And, what will happen to white achievement when the court desegregates all blacks in a school district and not just those few who are motivated enough to take advantage of a voluntary busing or transfer program or affluent enough to live in neighborhoods contiguous to white neighborhoods? Unfortunately, very little research has been conducted testing this assumption under these conditions, or even under the condition of court-ordered desegregation without "forced" busing that prevailed in the South during the late 1960's. Findings of the few studies that have been conducted (Felice, 1974; Stephenson and Spieth, 1972; Coats, Boothe, and Bartz, 1972; Evans, 1973) are contradictory and inconclusive at best. Yet, these are the desegregation conditions we must expect in the future.

The immediate problem then is to investigate or test under the conditions of the "new desegregation" the fundamental assumption that desegregation brings achievement gains for blacks while at the very least having no negative effects on white achievement. In other words, what happens to black and white achievement when desegregation by means of "forced" busing is imposed by court order on a resisting white populace? Given the basic assumption itself, two research hypotheses can be

posed to guide investigation. These are:

1. The academic achievement of blacks increases with desegregation;
2. The academic achievement of whites does not decline with desegregation.

Review of Literature

During the first decade after the Brown decision, the little research conducted on the effects of desegregation (or more accurately integration) focused on IQ (St. John, 1970). Very few investigations of the relationships between desegregation and academic achievement were undertaken, and those that were were rendered inadequate by severe methodological limitations. In 1964 Congress mandated as part of the Civil Rights Act the Equality of Educational Opportunity Survey (EEOS). Conducted by a team of social scientists under the leadership of James R. Coleman, the EEOS sampled public schools throughout the nation and analyzed, among other things, the relationship between verbal ability and various family background and school characteristics. While not, strictly speaking, a study of desegregation and academic achievement, the EEOS offers considerable insight into the problem.

The first analysis of the EEOS data, which was published in 1966 and has come to be widely known as the Coleman report, found that individual achievement was

little affected by differences between schools in such things as number of library books, but was greatly influenced by various within school characteristics such as the educational backgrounds and aspirations of the student body. As Coleman (1966) says, "The educational backgrounds and aspirations of fellow students appear to provide a facilitating or amplifying effect on the achievement of a student independent of his own background" (p. 305). The achievement of the highest achieving students, i.e., whites and Oriental Americans, was generally less dependent on characteristics of fellow students than was that of blacks or other minorities, leading Coleman to conclude,

The results suggest then, that the environment provided by the student body is asymmetric in its effects, that it has its greatest effect on those from educationally deficient backgrounds. The matter is of course more complex than this simple relation, doubtless depending on the relative number of high and low achieving students in the school, and on other factors. (p. 304)

Coleman also examined school proportion white to determine its impact on individual achievement. He finds that as the proportion white in a school increases, the achievement of students in each racial group increases. However, it appears that school proportion white is confounded to a great degree with other student body

characteristics. As Coleman says,

The higher achievement of all racial and ethnic groups in schools with greater proportions of white students is largely, perhaps wholly, related to effects associated with student body's educational background and aspirations. This means that the apparent beneficial effect of a student body with a high proportion of white students comes not from racial composition per se, but from the better educational background and higher educational aspirations that are, on the average, found among white students. The effects of the student body environment upon a student's achievement appear to lie in the educational proficiency possessed by that student body, whatever its racial or ethnic composition.
(pp. 307-308)

The implications of these findings for this present investigation of the assumption that desegregation raises black achievement while having no negative effect on white achievement are complex and require careful evaluation. First, the findings concerning the strong influence of student body educational background and aspirations on individual achievement, especially that of blacks and other minority groups, support the assumption that the achievement of blacks will increase with desegregation. Desegregation usually exposes black and white school peers with higher educational aspirations and stronger educational backgrounds than themselves. On the other hand, these findings do not support the assumption that the achievement of whites, especially that of low

achieving whites (as are commonly found in the South), will suffer no negative effects with desegregation. Desegregation usually exposes whites to black school peers with lower educational aspirations and weaker educational backgrounds than themselves.

The findings concerning the school proportion white effect are a bit more difficult to evaluate. It must be remembered that at the time the EEOS was conducted most racial mixing was due to integration (i.e., brought about naturally by changes in housing patterns) or to voluntary desegregation programs, which generally followed plans that simply allowed and/or encouraged blacks and whites to mix as they chose. Even the court-ordered desegregation of the South was voluntary for many blacks in a sense, for the courts were concentrating on dismantling the dual school districts of the region and generally permitting racial mixing to proceed on the basis of the freedom-of-choice doctrine. It is reasonable to suppose that most of those blacks who integrated were affluent enough to live in neighborhoods with or contiguous to whites, that most of those who voluntarily desegregated often did so as a matter of choice (prompted by higher educational aspirations and motivation to achieve), and that most of those who broke the barriers in the South under freedom-of-choice were highly motivated and able. Given these conditions, it is likely that a

selection bias is operating for those blacks who attended the racially mixed schools sampled by the EEOS. As Coleman says, the "problem of assessing [the school proportion white] effect is vastly complicated by the fact that students of both races in racially heterogeneous schools are not representative of all students of their race, but are often highly unrepresentative" (p. 307). Keeping these factors and limitations in mind, it nevertheless appears that the findings concerning the school proportion white effect also support the assumption that black achievement will increase with desegregation and fail to support the assumption that white achievement will suffer no negative effect.

In summary, the first analysis of the EEOS data supports the assumption that black achievement will increase with desegregation but does not support the assumption that white achievement will suffer no negative effect. As whites are exposed to numbers of low achieving, less aspiring blacks, their achievement may in fact decline, especially in the case where the whites are low achievers to begin with and desegregation significantly lowers the ratio of high to low achievers. Since 1966, there have been several reanalyses of and commentaries upon the EEOS data (U.S. Commission on Civil Rights, 1967; Harvard Educational Review, 1969; Jencks, 1972; Mosteller and Moynihan, 1972). With one exception, the

1967 U.S. Commission on Civil Rights study Racial Isolation in the Public Schools, these reanalyses and commentaries have neither discredited nor substantially modified the findings of the first analysis. The Commission, which uses a different analytical technique and classroom proportion white in place of school proportion white, finds that when socioeconomic status is taken into account, there remains a substantial classroom proportion white effect for black students. In short,

when relatively disadvantaged Negro students are in class with a majority of similarly disadvantaged white students, their performance is higher than when they are in a class with a majority of equally disadvantaged Negroes. A similar relationship obtains for more advantaged Negro students, when those in school with similarly advantaged Negroes are compared with those in school with similarly advantaged whites. (U.S. Commission on Civil Rights, 1967, p. 91)

This finding implies a stronger proportion white effect than that found by Coleman, at least for black students (the Commission focuses upon black achievement). However, the Commission does not take into account the effects of peer educational backgrounds and aspirations as does Coleman.

Since 1964 a number of studies have been conducted examining the relationships between desegregation and academic achievement. As noted previously, many if not most of these studies are unpublished and were not

available to this researcher. The unpublished literature is referenced and discussed by several authors (e.g., St. John, 1970; Armor, 1972; Pettigrew et al., 1973), but since these studies were not directly available, they are not discussed in this review. Relevant studies that were available are summarized in Table 1.

As this table shows, studies of voluntary desegregation and academic achievement in Riverside, Sacramento, Chicago (District Four), White Plains, and Buffalo have been conducted by Purl and Dawson (1971), the Sacramento City Unified School District (1971), Connery (1971), Western Regional School Desegregation Projects (1971), and Banks and DiPasquale (1970), respectively. The White Plains and Buffalo studies are fairly well-designed and show that desegregated blacks did better than segregated blacks and that whites were doing as well or better than before desegregation. However, the White Plains study lacks statistical tests of the hypotheses, and neither of these studies can guarantee equivalence of the desegregated and segregated groups. The Riverside, Sacramento, and Chicago (District Four) studies are seriously flawed and their usefulness is questionable. In the Riverside study, Mexican-Americans and blacks are analyzed as a single unit and the analytical units are very small (less than 10 in some cases). In the Chicago (District Four) study, the ethnic composition of the bused group is

Table 1. Studies of Desegregation and Academic Achievement

Location and Circumstances of Desegregation	Procedures	Findings	Deficiencies
<p>Riverside, Calif. Voluntary and gradual desegregation, begun in 1965. Three minority schools were closed and 225 students at each grade level were bused to white schools. Bused pupils were 53% Mexican-American and 47% black and constituted no more than 15% of the population in any receiving school. A new instructional program emphasizing reading was adopted at the beginning of desegregation (Purl and Dawson, 1971).</p>	<p>Subjects (ethnic groups not specified) in grades K-3 during their first year of desegregation are compared longitudinally with all K-3 students in the district. Comparisons are made each year from 1965-1969. Bused students in grades K-3 are compared with receiving K-3 students each year from 1965-1969 in a cross-sectional design. Standardized scores on standard achievement tests from the district testing program were used.</p>	<p>The longitudinal analysis shows:</p> <ol style="list-style-type: none"> 1. The achievement of bused students does not increase. 2. Bused students attending grades K-2 at desegregation show neither increases nor decreases. 3. Bused students attending grade 3 at desegregation show a decrease. <p>The cross-sectional analysis shows:</p> <ol style="list-style-type: none"> i. K-3 achievement of both bused and receiving students increases between 1966-1970. 2. Bused K students show significantly higher achievement in 1966 than in 1970, but those in grades 2-3 show lower achievement in 1966. 3. Bused students in grades 2-3 show lower average achievement than do segregated. 	<ol style="list-style-type: none"> 1. Mexican-Americans and blacks are mixed in the bused group. Separate analyses are not done. 2. Analytic sample sizes are small. 3. The report itself lacks clarity and it is difficult to determine just what procedures were followed. 4. Contradictions between longitudinal and cross-sectional results are unresolved.

Location and Circumstances
of Desegregation

Location and Circumstances of Desegregation	Procedures	Findings	Deficiencies
Riverside, California (continued)		(The authors note that three previous reports have shown very little change in the achievement of either minority or majority pupils.)	
Sacramento, Calif. Voluntary, begun in 1966. Students were transferred from high minority schools by a board decision to end de facto segregation. ESEA Title I monies were used to assist transferring students in a program called Project Aspiration. (Sacramento City Unified School District, 1971)	This report summarizes the results of all evaluations from 1966-1971. All evaluations used the same cross-sectional design comparing matched integrated and non-integrated groups (ethnic composition not always specified).	<p>1. At the end of the first year, 1966-67, integrated pupils scored at higher levels than non-integrated and made larger gains except on non-language ability subtests. Differences were not statistically significant.</p> <p>2. Second year results were the same except that grade 5-6 differences in language ability and arithmetic achievement were statistically significant.</p> <p>3. The 1970-71 report compared grade 2-6 integrated blacks receiving compensatory education on the California Achievement Test (CAT) reading and arithmetic subtests and found:</p>	<p>1. Reassigned students received multiple extra service (e.g., study trips, after school study centers, in-service in compensatory education for their teachers).</p> <p>2. In at least one of the evaluations, 1968-69, the transfer group includes Spanish-surname students.</p>

Table 1 - continued

Location and Circumstances of Desegregation	Procedures	Findings	Deficiencies
Sacramento, Calif. (continued)	Median reading scores of bused, non-bused, and residential pupils are examined.	<p>a. Grade 4 integrated S's scored significantly higher (.01) on reading than the non-integrated;</p> <p>b. Grade 4 and 6 integrated S's scored significantly higher in arithmetic (.001) than the non-integrated.</p>	<p>1. No statistical tests.</p> <p>2. Ethnic composition of the bused and receiving groups is not specified.</p>
Chicago, District Four, Austin Area. Voluntary, begun in March, 1968. By School Board mandate the bused-to-residential ratio cannot exceed 15% in the receiving schools. Out of 4286 pupils 496 (11.5%) were bused. Bused children were "recruited" for entry into the special busing program from all students in the bused residential area. The author notes that the busing program does not have holding power. (Connery, 1971)		<p>1. Bused students improve in reading in relation to time in busing program.</p> <p>2. Non-bused students improve in reading to a lesser degree than do bused students.</p> <p>3. Residential pupils show no change.</p>	

Table 1 - continued

Location and Circumstances of Desegregation	Procedures	Findings	Deficiencies
<p>White Plains, N.Y. Voluntary. Complete integration in 1964 and first city in U.S. to do so. By board mandate, the black-white ratio cannot be less than 10% nor greater than 30%. Attendance zones are revised annually to see that balance is maintained and busing is provided as needed. (Western Regional School Desegregation Projects, 1971)</p>	<p>Elementary pupil's median percentile SAT reading and arithmetic scores are examined longitudinally over a six year period. Pre-measures prior to integration are included. Scores of an older cohort of pupils who attended segregated schools in 1960 are used as a comparison. Both blacks and whites are evaluated.</p>	<ol style="list-style-type: none"> 1. Blacks who have attended integrated schools since grade 1 are achieving better than are blacks who were in grade 3 when desegregated. 2. Both of the above groups are achieving better than blacks who spent K-6 in segregated schools before integration in 1964. 3. Whites are doing as well or better than prior to 1964. 	<p>1. No statistical analysis are performed.</p>
<p>Buffalo, New York. Voluntary, begun September, 1967. Approximately 1200 blacks from six segregated inner-city schools were bused to 22 majority-white schools. (Banks and DiPasquale, 1970)</p>	<p>All students in grades 5-7 of both the sending and receiving schools were pre-tested prior to desegregation on the reading and arithmetic subtests of the SAT. Post-testing was done in the spring of 1968. Paragraph Meaning scores of three matched groups, i.e., desegregated blacks, blacks remaining in segregated schools and desegregated whites, were compared using covariance analysis.</p>	<ol style="list-style-type: none"> 1. Blacks integrated into classes with whites made greater gains in achievement than did blacks who remained in segregated school. 2. Whites did not show achievement losses and in fact gained more than did both groups of blacks. 	<p>This appears to be a well-designed and executed study.</p>

Table 1 - continued

Location and Circumstances of Desegregation	Procedures	Findings	Deficiencies
Buffalo, New York (continued)	Comparisons showed that the two black groups were approximately equivalent in achievement on the pre-test for grade 5 and 6 but not for grade 7.	.	
Waco, Texas. Court-ordered begun 1971. Approximately 1600 blacks were bused to previously all-white schools. (Felice, 1974)	CAT reading and arithmetic scores of bused and non-bused blacks were compared by mean of t ratios.	<ol style="list-style-type: none"> 1. Bused blacks' reading and arithmetic achievement was significantly lower than that of non-bused blacks. 2. Both bused and non-bused blacks lost ground in the 2-3 years between pre- and post-testing, but differences between bused and non-bused blacks losing the most ground. 3. The differences persist when IQ is controlled. 	This appears to be a well-designed and executed study.

Table 1 - continued

Location and Circumstances of Desegregation	Procedures	Findings	Deficiencies
<p>Miami, Florida. In 1969, the court ordered "total integration" under the direction of HEW. Desegregation had begun in Miami in 1959 and had progressed to varying degrees of minority-majority mixing by 1969. Authors note that there was considerable desegregation prior to court order and that this study is actually investigating increased levels of ethnic desegregation. (Stephenson and Spieth, 1972).</p>	<p>Observed SAT reading and arithmetic scores are compared with expected scores, which are derived by means of regression procedures. Pre-post reading and math scores are also compared. Comparisons were made for blacks, whites, Spanish-Americans. Performance graphs are generated showing achievement as a function of percent black of school.</p>	<p>Several trends were noted:</p> <ol style="list-style-type: none"> 1. Black elementary students did best when they stayed in schools most nearly like their former school in ethnic composition, as did Spanish-American and white students. 2. In junior high, observed scores for all ethnic groups were substantially below expected scores, becoming more so as the percent black increased. 3. The black-white achievement gap neither increased nor decreased. 	<ol style="list-style-type: none"> 1. Desegregation may be confounded with specially funded desegregation activities. The research report does not make this clear. 2. Only the first year of desegregation, 1970-71, is analyzed. 3. Generally speaking, this is a well designed and executed study.

Location and Circumstances
of Desegregation

Procedures	Findings	Deficiencies
<p>Kalamazoo, Michigan. Court-ordered, begun September, 1971. Systemwide desegregation by means of two-way busing. (Coats, Boothe, and Bartz, 1972)</p> <p>SAT (district administered) scores on a random sample of grade 2 and 6 classrooms (heterogeneously grouped for ability) was selected. State assessment test results were available for grades 4 and 7 and the same procedure was followed in selecting a sample of classrooms.</p>	<p>1. There is no change in the composite (eight subtests) average SAT grade equivalent for either grade 2 or 6 after one year of desegregation.</p> <p>2. There is no change in the district mean state assessment scores for either grade 4 or 7 after one year of desegregation.</p>	<p>1. Black and white achievement is not analyzed separately.</p> <p>2. No statistical analyses are done.</p> <p>3. Eight SAT subtests are summed to derive a composite score. This is not an appropriate use of the SAT.</p>

not specified and no statistical tests are performed. In the Sacramento study, the desegregated blacks received multiple extra educational services through ESEA Title I funds.

Studies of court-ordered desegregation and academic achievement in Waco, Miami, Kalamazoo, and Ft. Worth have been conducted by Felice (1974), Stephenson and Spieth (1972), Coats, Boothe, and Bartz (1972), and Evans (1973), respectively. While the Kalamazoo study is prohibitively flawed, the Waco, Miami, and Ft. Worth studies appear to be fairly well-designed and executed. However, the Miami study indicates that desegregation may be confounded in some unspecified manner with specially funded desegregation activities, the Ft. Worth study analyzes Mexican-Americans and whites as a single group, and the implications of the findings of the Ft. Worth study are not clear relative to the problem of desegregation and academic achievement. In Waco, Felice (1974) finds that the reading and arithmetic achievement of bused (desegregated) blacks is significantly lower than that of non-bused (segregated) blacks. These differences persist when IQ is controlled. In Miami, Stephenson and Spieth (1972) find that black elementary students showed a trend to do best when they stayed in schools most nearly like their former schools in ethnic composition,

as did Spanish-surname students and whites. In junior high, the observed scores for all ethnic groups were substantially below expected levels, becoming more so as the percent black increased.

In summary, the literature on desegregation and academic achievement is sparse and contradictory at best. Clear-cut support for the assumption that desegregation raises black achievement while having no negative effect on white achievement does not emerge from the empirical evidence. Thus the translation of the directional research hypotheses generated by this assumption into directional or one-tailed statistical hypotheses is not justified.

CHAPTER II

PROCEDURES

Introduction

Ideally, investigation of these issues should be of national scale and involve a large sample drawn from all areas of the country. Obviously, such an effort is beyond the scope of this study. Information can be gained however by investigating these questions in the case of Jacksonville, Florida, one of the first cities to experience court-ordered desegregation by means of forced busing.

Jacksonville is an industrial, urban community of approximately 530,000 (United States Department of Commerce, 1972)¹, which encompasses, under a consolidated city government, all of Duval County's 840 square miles. Blacks, most of whom live in the core city and proximate rings, make up 22.3% of the population. Median income for the community as a whole is \$8671, with 14.1% below poverty level. Median income for blacks is \$5122, with 34.8% below poverty level. Median education level for

¹All demographic data for the community is taken from this document.

the total community is 12.0 years of school completed and for blacks, 9.5 years completed. The Jacksonville school system is an arm of the consolidated city government and serves both core city and suburbs as a single school district. With a total of 102,944 regular students in grades 1-12 in 1974-75, Jacksonville is the fourth largest district in the State of Florida and one of the 25 largest in the nation. Across grades 1-12, blacks average 32% of the total student population.

Desegregation in Jacksonville met with heavy resistance from the white community and establishment, and was accomplished only under the close supervision of the court after 11 years of litigation. In December, 1960, the first of a series of suits was filed against the school board, which at this time was still operating two racially separate systems, each with its own director and budget. In August, 1962, the court enjoined the board from operating a compulsory dual system and ordered the development of a plan for eliminating the dual attendance zones and establishing a unitary system. September, 1964, saw the implementation of the board's plan, which projected the creation of a unitary system by 1974 through grade-by-grade, freedom-of-choice desegregation. By January, 1967, it was clearly evident that the plan was a failure and the court abolished the freedom-of-choice principle, ordering the board to draw up another plan.

The board failed to comply and in August, 1967, the court ordered the board to seek the assistance of the HEW South Florida Desegregation Center, located at the University of Miami. In August, 1969, the court ordered the board to develop a plan based on the HEW recommendations and the board again failed to comply. Faced with this resistance, the court in December, 1969, ordered the reassignment of teachers and staff throughout the system to achieve a ratio of 70% white and 30% black in each school, and in a supplemental order of January, 1970, requested that HEW determine the procedures necessary to fully desegregate the system. In August, 1970, while hearing the HEW recommendations, the court ordered the immediate desegregation of every black elementary school with an attendance zone adjacent to a predominantly white school, utilizing pairing and clustering techniques. The school board appealed these orders and the plaintiffs cross-appealed. While these appeals were pending, the Supreme Court in 1971 decided the historic Swann v. Charlotte-Mecklenburg Board of Education case and the board capitulated.

The December, 1969, and August, 1970, court orders requiring the reassignment of faculty and staff throughout the system and the desegregation of the nine black elementary schools with attendance zones adjacent to predominantly white schools were implemented by the

school board during January, 1971. The board at this time also began cooperative negotiations with the plaintiffs and the court to devise a permanent settlement. Negotiations reached an impasse and the court took over, issuing the final desegregation order in June, 1971. In September, 1971, Phase I of the final court plan desegregated the 18 all-black schools in the core city by cross-busing core-city and suburban students. In September, 1972, Phase II desegregated all remaining schools in the district by increasing the busing and establishing sixth and seventh grade centers. The final court order requires that each school have a student body with 24%-34% blacks, and that both blacks and whites be bused at some point during their educational experience. In the words of the court,

The desegregation plan for Duval County is best understood when examined from a pupil's viewpoint. A black student can expect to spend his first five years of school attending an elementary school in a white neighborhood. His education during the sixth and seventh grades will occur in grade centers located in black neighborhoods. In all likelihood, he will return to a formerly white junior high school for the eighth and ninth grades. Finally, he would attend an integrated senior high school, which formerly may have been predominately black or white. The closing of some of the black elementary schools, previously discussed, will enhance quality education for all pupils.

A white student can expect to spend his first five years of school attending his neighborhood school. His education during the sixth and seventh grades will occur in grade centers located in black neighborhoods. He will then go to the junior high and senior high schools he would have attended had desegregation not been ordered. (U.S. District Court, 1971, pp. 24-25)

The district's implementation of the plan has been closely monitored by local civil rights organizations and supervised by the court. Particular attention has been paid to insure that black children have not been resegregated at the classroom level.

In response to this rapid and complete desegregation, large portions of the adult white community (and the student white community at the high school level) reacted with protest, hostility, and demonstrations during Phase I and the first half of Phase II, particularly during the early fall of 1971. In addition, many of the more affluent whites placed their elementary school children in private schools. By the late fall of 1972, however, the community had accepted desegregation and little complaint, other than rumblings about busing, was heard.

The Jacksonville experience thus provides an opportunity to investigate the basic assumptions about black and white achievement in the context of the "new desegregation," i.e., under conditions of court-ordered desegregation that involves "forced" busing and strong white

opposition. Because achievement data for Phase II upper elementary students are readily available to this researcher and because the elementary curriculum emphasis in Jacksonville is reading and arithmetic, this study focuses on the reading and arithmetic achievement during the first and second years of desegregation of those students desegregated as they entered grade four in September, 1972.

Design and Methodology

The ideal design for investigating the relationships between reading and arithmetic achievement and desegregation (under any conditions) is a longitudinal design which compares the achievement of students randomly assigned to experimental and control groups. Both black and white students should be randomly assigned according to the desired sampling plan to desegregated and not-desegregated conditions, both of which offer equal educational opportunities in terms of school, teacher, and curriculum quality. These conditions should then be maintained over a period of time, and the subjects' achievement measured at predetermined points (including pre-treatment). The groups could then be compared as desired to determine the effects of desegregation.

However, as several authors (Campbell, 1963; Campbell and Stanley, 1963; Stephenson and Spieth, 1972) have pointed

out, such elegance of design is virtually unobtainable in educational research. Political considerations, judicial mandates, and parental or administrative preferences usually dictate pupil assignment and prohibit randomization, and this lack of randomness alone puts the experiment out of reach. As one "best available" solution to this common problem, Campbell (1963) argues for the use of nonequivalent comparison groups in a multiple time-series design as one of the strongest and most "natural" designs available to the educational researcher. He stresses, however, that the comparison groups should be as like the experimental group as possible without randomization in order for results to be interpretable and meaningful.

The problem of nonequivalent experimental and control groups is, as discussed earlier, an especially serious issue in research on desegregation and academic achievement, much of which is severely weakened by selection bias in the experimental (desegregated) group. Desegregation has characteristically proceeded from moral and political rather than scientific perspectives, and in case after case the moral and political priorities have not only made random assignment out of the question but have also made it impossible to secure acceptable nonequivalent comparison groups. As Armor (1972) notes, the implementation of desegregation policies has typically destroyed

the conditions under which those very policies could be conclusively evaluated. Unfortunately, Jacksonville offers no exception. The court desegregated the entire school system in three steps, and at each step three distinct groups of students were nonrandomly desegregated. In the first step, those predominantly black elementary schools with attendance zones immediately adjacent to predominantly white schools were desegregated by pairing and clustering contiguous schools. In the second step (Phase I of the final court plan), the all-black elementary schools in the core city were desegregated by cross-busing core-city blacks with suburban whites. In the third step (Phase II of the final court plan), all remaining elementary schools were desegregated by increasing the busing. It must be assumed that the three groups desegregated during these three steps differ seriously from each other on several dimensions, particularly family income level and/or socio-economic status. In the judgment of this researcher, such group differences mitigate strongly against the use of groups one and two as comparisons for group three, the population of interest in this study. Further, all students within a group were desegregated simultaneously, thereby eliminating any possibility of obtaining a not-desegregated comparison group within group three.

Therefore, a single-group longitudinal design is used in this study. This design limitation is countered somewhat by a conservative approach in drawing conclusions about racial performance. The reading and arithmetic achievement patterns of black males, black females, white males, and white females during their first (grade four) and second (grade five) years of desegregation are analyzed separately, and conclusions concerning changes in black and white achievement are drawn on the basis of the performance of both the males and the females within each racial group.

Reading achievement is measured by the Paragraph Meaning, Word Meaning, and Language subtests of the Stanford Achievement Test (SAT), 1963 edition, which is administered annually as part of the regular district-wide testing program. Arithmetic achievement is measured by the Arithmetic Computation and Arithmetic Concepts subtests. Data are gathered on each subject at three points in time, i.e., the end of grade three, which is the year prior to desegregation; the end of grade four, which is the first year of desegregation; and the end of grade five, which is the second year of desegregation. The Primary II Level, Form W of the SAT was administered at grade three; the Intermediate I Level, Form Y, at grade four; and the Intermediate II Level, Form W, at grade five.

Because rates of growth as well as levels of achievement are of interest in this study the null hypotheses are formulated in terms of year-one and year-two achievement slopes rather than in terms of differences between grade four mean achievement and grade three mean achievement, etc. The slope of a line is defined as the ratio between the change in y and the change in x, i.e.,

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1},$$

where y=mean achievement and x=grade. The slope of the achievement line between two grades is, since the change in x=1, exactly equivalent to the difference between the achievement means for each grade. The t statistic is used to test the following null hypotheses for blacks and for whites:

1. The year-one reading achievement slope is zero;
2. The year-two reading achievement slope is zero;
3. The difference between the year-one and year-two reading achievement slopes is zero;
4. The year-one arithmetic achievement slope is zero;
5. The year-two arithmetic achievement slope is zero;
6. The difference between the year-one and year-two arithmetic achievement slopes is zero.

(As noted earlier, the research literature does not justify one-tailed statistical hypotheses for this study even though the research hypotheses are themselves one-tailed.)

Since the test of any one null hypothesis for either racial group involves multiple t-ratios (e.g., to test hypothesis one for blacks, the year-one achievement slopes of both black males and black females on Paragraph Meaning, Word Meaning, and Language must be tested), Levitt's (1961) procedure for determining the probability of finding one or more statistics $p < .05$ by chance when multiple statistics are computed is used to obtain an overall test of the null hypothesis. This procedure assumes that the multiple statistics which have been computed are independent; however, Levitt (p. 155) notes that in the particular case of comparisons among means no great error is made by violating this assumption of independence. If the null hypothesis is rejected, the appropriate individual t-ratios are examined to ascertain the sources of the changes that resulted in rejection. The appropriate slopes are then examined to determine the nature, direction, and magnitude of these changes. (This approach is somewhat analogous to analysis of variance, where an F-ratio is used to determine the existence of overall significant differences among means, and the specific nature, direction, and magnitude of these differences are then determined by an examination of the means themselves.) In other words, in order to evaluate the research hypotheses, the specific changes in achievement patterns that cause rejection of the null hypotheses must

themselves be examined. It is not sufficient to know only that the null hypotheses are rejected. We must also know whether achievement increased or decreased (and on which particular subtests) before we can evaluate the research hypotheses themselves. In fact, three null hypotheses must be examined in detail in order to decide whether a single research hypothesis should be accepted or rejected.

The Sample

A sample of 444 students who had been desegregated in September, 1972, as they entered grade four was drawn from the population of students attending grade six during April-May, 1975. Data were gathered from randomly selected cumulative folders in seven of the 14 sixth grade centers receiving students desegregated in September, 1972. These seven centers were chosen because they had high concentrations of Phase II children and were readily accessible to this researcher because of their status as Title I eligible schools.² National percentile scores on

² A school is eligible for Title I services if the percent of students receiving free or reduced lunches exceeds the district percent. Of the 14 centers receiving Phase II students, all had (as of February, 1975) free and reduced lunch participation exceeding that of the district. Table A-1, Appendix A shows the mean, median, and range of percent free and reduced lunch for the sampled, non-sampled, and total groups. As the table shows, the differences in free and reduced lunch participation among the sampled centers, the non-sampled centers, and all centers are negligible. Further, attendance of a Title I

the three reading subtests and the two arithmetic subtests of the SAT were collected for grades three, four, and five for all subjects. Subjects who did not have scores on all five subtests for all three years were omitted. Fifteen subjects were omitted because of missing data, leaving a sample of 429. The number of subjects omitted was not judged great enough to warrant special treatment of the data.

The sample consisted of four subsamples, i.e., black males (N=102), black females (N=106), white males (N=110), and white females (N=111). Mean age in months as of April 1, 1975, for each subsample was 142.76 months, 141.23 months, 143.97 months and 142.25 months respectively. Mean IQ scores for each subsample as measured by the Cognitive Abilities Test, Multi-Level Edition, Form 1, administered during grade four in November, 1972, are shown in Table A-3, Appendix A. As this table shows, the sample as a whole is of low average ability, with the

sixth grade center is not synonymous with receipt of Title I services in grade six or any earlier grade. Although it is impossible to determine whether or not an individual subject has actually participated in Title I programs, it is possible to determine what percent of the sample at each grade level attended a school where such programs were available. As Table A-2, Appendix A shows, less than 2% of the sample attended such a school in grade four, the first year of desegregation, and only 15% of the blacks and 19% of the whites did so in grade five, the second year of desegregation.

whites higher than the blacks and the females higher than the males. Subsample national percentile means and standard deviations on all five subtests are shown in Appendix A, Tables A-4 and A-5 respectively. As Table A-4 shows, mean achievement is low, with means of whites generally exceeding those of blacks, and means of females those of males. As Table A-5 shows, the scores of black females generally show greater dispersion than those of black males, while the scores of white males generally show greater dispersion than those of white females.

Although family income data for individual subjects was not available, a rough picture of the family income levels of blacks and whites can be obtained by looking at the income levels of the neighborhoods (United States Department of Commerce, 1972) served by those schools attended by these groups during grade three in 1971-72, the year prior to their desegregation. Since at this time busing had not altered the attendance zones of the not-desegregated schools, it is reasonable to assume that the children attending a particular school lived in the surrounding neighborhoods. Given this assumption the family income level of the neighborhoods contiguous to a school should be indicative of the family income level of the students attending the school. Assuming no change in family income level between 1971-1975, the income levels of the neighborhoods surrounding the schools attended in

grade three then become useful estimates of the family income level of blacks and whites. These estimated family income levels for all subjects, blacks, and whites are shown in Table A-6, Appendix A. As the table shows, 73% of the black subsample fell into the \$3600-\$8599 range of estimated family income, while only 27% fell into the \$8600 and above range. In contrast, only 30% of the white subsample fell into the \$3600-\$8599 range, while 70% fell into the \$8600 and above range. Eighty-two percent of the total sample fell into the \$3600-\$9999 range; 18%, into the \$10,000 and above range.

This sample represents a stable population, which was desegregated upon entering grade four in September, 1972, Phase II of the final court plan, and has remained in the district through three years of desegregation until May, 1975. Unfortunately, data on the size and characteristics of this population are not available. However, it is reasonable to assume that, because of "white flight," this population is less able and less affluent and that these characteristics are reflected by the low IQ, achievement, and estimated family income level of the sample. These assumptions are supported by Klock's (1974) study of white flight in Jacksonville and by public and private school enrollment data. Klock finds that for the cohort desegregated upon entering grade four in September, 1971, Phase I of the final court plan,

white flight has an impact on group IQ. Using the Kuhlman-Anderson Intelligence Test, Form D, 1963 edition, administered in November, 1971, to students in grade four as part of the regular county testing program, Klock shows that the mean IQ of those students leaving the system between grades four and five is significantly higher ($p=.05$) than the mean IQ of all students desegregated in grade four, while the mean IQ of those remaining through grades four, five, and six is significantly lower than the mean of all students desegregated in grade four. Both public and private school enrollment data indicate that many of the more affluent white students in Jacksonville transfer to private schools beginning at grade six to avoid attending a sixth grade center, all of which are located in black neighborhoods. As shown in Appendix A, Tables A-7 and A-8 respectively, beginning with the establishment of sixth grade centers in 1972-73 the percent of blacks in grade six in public school for a given year has exceeded the percent in grades one-five for that same year from 3%-8% and the percent in the feeder grade five of the preceding year from 4%-8%, while private school enrollment in grade six has jumped from 21% to 26%-29% of the total private school enrollment in grades one-six.

CHAPTER III

RESULTS

Subjects' national percentile scores were first converted to z-scores by means of the University of Florida Education Evaluation Library EEL 588. Table A-9, Appendix A provides a listing of each subject's scores on each subtest. Z-score means on each subtest at each grade level were next obtained for each of the four subsamples by means of Biomedical Computer Program 02D (Dixon, 1970). The plots of these means are shown in Figures 1-5. Using these means, each null hypothesis was then tested for blacks and for whites by testing the hypothesis separately for males and females and applying Levitt's (1961) procedure to the resulting multiple significance tests to obtain an overall test of the null hypothesis. For example, hypothesis one for blacks, i.e., "the year-one reading achievement slope is zero", was tested by testing "the year-one slope is zero" for both black males and females on the Paragraph Meaning, Word Meaning, and Language subtests. Six separate t-ratios were computed. The probability of finding x number of these six t-ratios significant by chance, where x is the number found with $p < .05$, was determined. If this

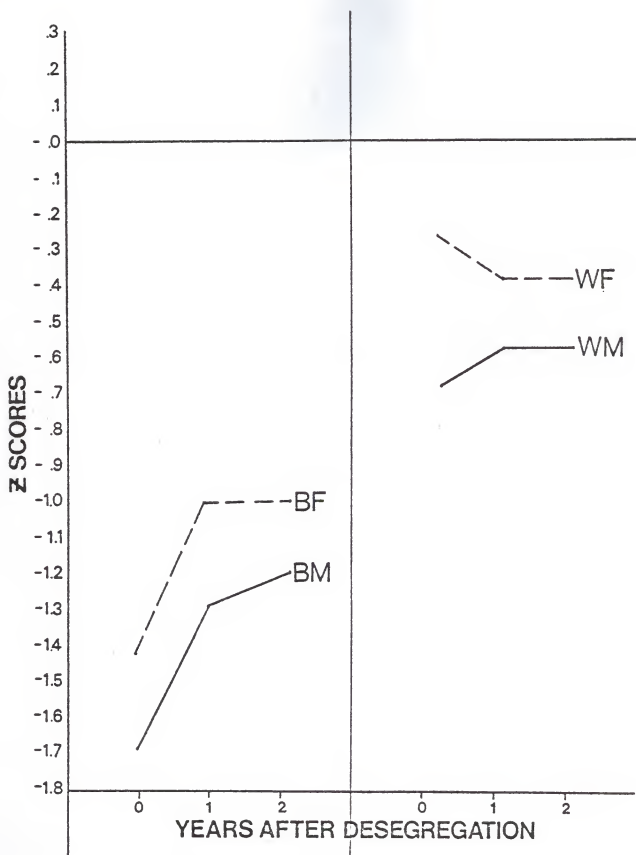


Figure 1. Means for Paragraph Meaning

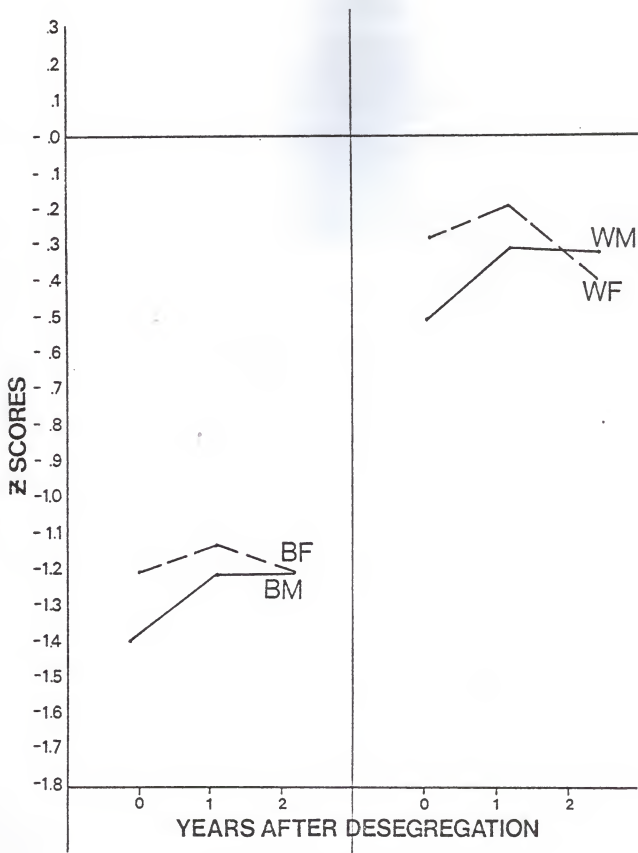


Figure 2. Means for Word Meaning

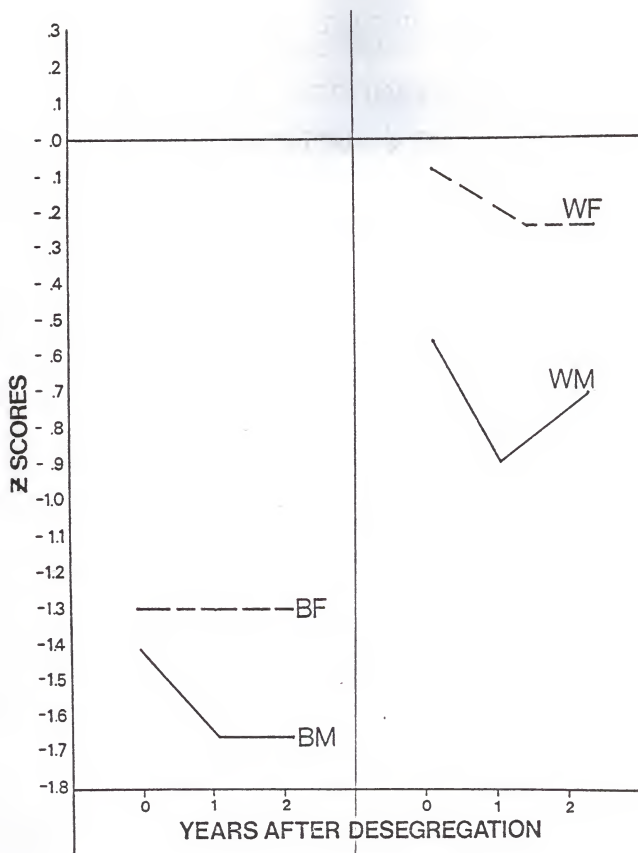


Figure 3. Means for Language

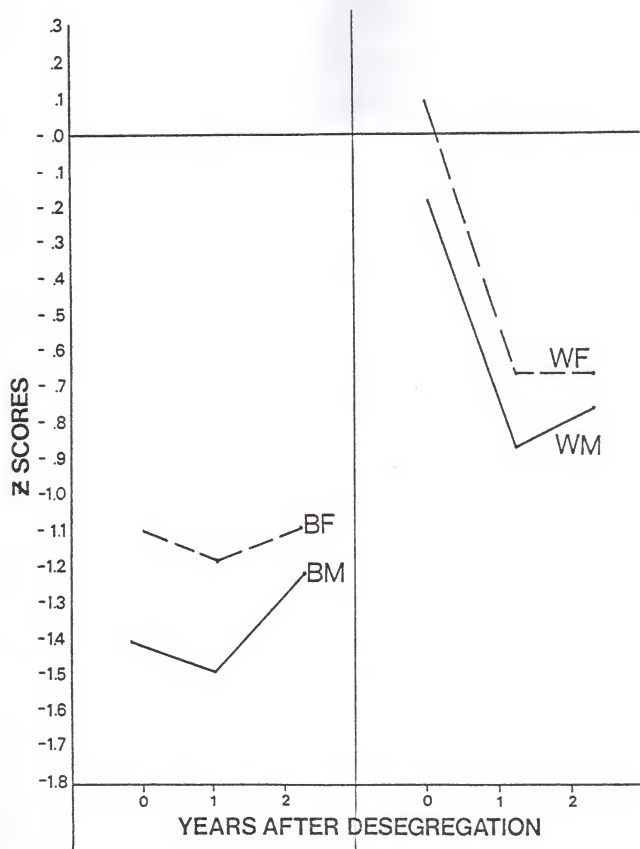


Figure 4. Means for Arithmetic Computation

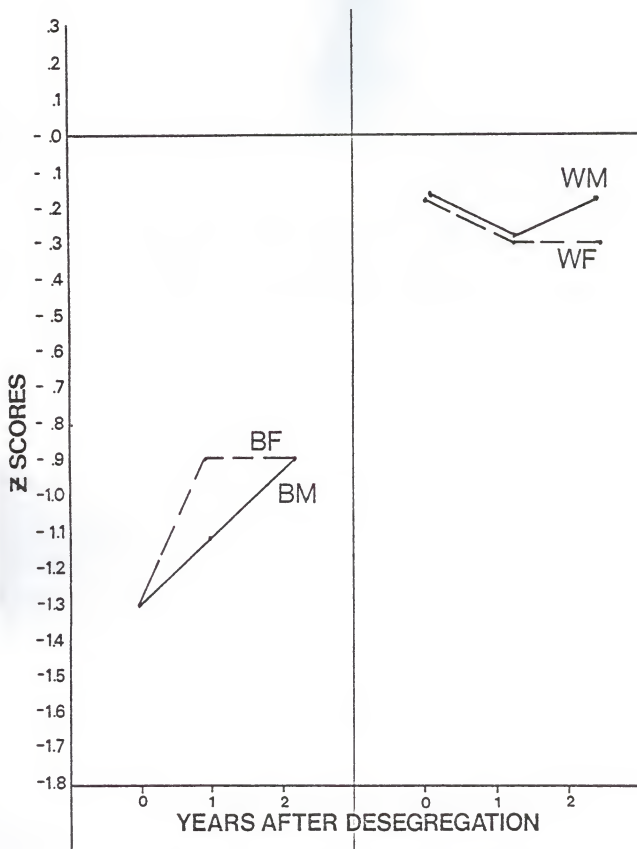


Figure 5. Means for Arithmetic Concepts

probability was .01 or less, the null hypothesis was rejected. If this probability was greater than .01, the null hypothesis was not rejected. Table 2 shows the overall significance tests of the null hypotheses. Table 3 shows slope values and all computed t-ratios. As Table 2 shows, most of the null hypotheses were rejected at the .01 level of significance for both blacks and whites. The null hypotheses not rejected are hypothesis two ("the year-two reading achievement slope is zero") for both blacks and whites, hypothesis three ("the difference between the year-one and year-two reading achievement slopes is zero") for blacks alone, and hypothesis five ("the year-two arithmetic achievement slope is zero") for whites alone. In other words, the reading and arithmetic achievement of both blacks and whites changes, and, with one exception (blacks' arithmetic achievement), all significant change occurs during the first year of desegregation. Further, with one exception (blacks' reading achievement) there is a difference between year-one and year-two reading and arithmetic achievement. Table 3 shows the nature, direction, and magnitude of the changes and differences. This information is also graphically illustrated by the plots of the z-score means in Figure 1-5.

In reading achievement, both black males and black females show significant positive year-one slopes of

Table 2. Overall Tests of Hypotheses

EFFECT	GROUP	HYPOTHESIS ^a	NO. OF t RATIOS COMPUTED	NUMBER OF p's < .05	OVERALL PROBABILITY
Reading	Blacks	Slope 1=0	6	4	.00 *
		Slope 2=0	6	0	
		Slope 2-1=0	6	2	.03*
	Whites	Slope 1=0	6	3	.00
		Slope 2=0	6	2	.03*
		Slope 2-1=0	6	3	.00
Arithmetic	Blacks	Slope 1=0	4	2	.01
		Slope 2=0	4	2	.01
		Slope 2-1=0	4	2	.01
	Whites	Slope 1=0	4	2	.01
		Slope 2=0	4	1	.19*
		Slope 2-1=0	4	3	.00

^aFor the sake of readability, the year-one slope is referred to as slope 1 and the year-two slope as slope 2.

*Fail to reject.

Table 3. Summary of Significance Tests

GROUP	SUBTEST	SLOPE 1	t	SLOPE 2	t	SLOPE 2-1	t
Black Males	Para Mng	.39	4.98**	.11	1.65	-.28	2.21*
	Word Mng	.23	3.15**	.01	0.21	-.22	1.84
	Lang	-.21	2.89**	-.01	0.16	.20	1.78
	Arith Comp	-.06	0.81	.27	4.08**	.33	2.96**
	Arith Conc	.26	2.58*	.20	2.18*	-.05	.30
Black Females	Para Mng	.39	5.73**	.07	1.23	-.32	2.99**
	Word Mng	.11	1.29	-.08	1.22	-.19	1.49
	Lang	.05	0.71	-.05	0.91	-.10	.87
	Arith Comp	-.09	1.20	.08	0.96	.17	1.25
	Arith Conc	.39	4.59**	.01	0.18	-.38	2.66**
White Males	Para Mng	.11	1.79	-.02	0.31	-.13	1.18
	Word Mng	.18	2.65**	-.10	1.65	-.27	2.69**
	Lang	-.28	3.99**	.15	2.24*	.44	3.57**
	Arith Comp	-.63	6.92**	.06	0.76	.69	5.23**
	Arith Conc	-.14	1.68	.20	2.26*	.34	2.23*
White Females	Para Mng	-.08	1.12	.06	0.99	.13	1.16
	Word Mng	.05	0.72	-.26	3.67**	-.31	2.57*
	Lang	-.19	2.78**	.02	0.36	.21	1.80
	Arith Comp	-.77	6.86**	-.01	0.17	.76	5.67**
	Arith Conc	-.15	1.91	-.01	0.08	.16	1.15

*Significant, .05, $t = 1.98$, $df=100$ **Significant, .01, $t = 2.63$, $df=100$

large magnitude in Paragraph Meaning. Black males alone show a significant positive year-one slope of moderate magnitude in Word Meaning and a significant negative year-one slope of moderate magnitude in Language.

White males and females both show no significant change in Paragraph Meaning slopes but do show significant negative year-one slopes of moderate magnitude in Language. White males alone show a significant positive year-one slope of moderate magnitude in Word Meaning and significant differences of moderate and large magnitude between year-one and year-two slopes in Word Meaning and Language, respectively. White females show a trend toward a similar difference between first and second year Word Meaning achievement, as evidenced by the significant difference at the .05 level between year-one and year-two Word Meaning slopes. These differences between the year-one and year-two slopes for white males in Word Meaning and Language and for white females in Word Meaning are accounted for by changes in slope direction and magnitude in year two. In Word Meaning, white males show a year-two negative slope (not significant itself) of moderate magnitude after a year-one positive slope of larger magnitude, and white females show a year-two negative slope (not significant in the context of the overall test) of moderate magnitude after a year-one positive slope of small magnitude. In Language, white males show a year-two

positive slope of moderate magnitude after a year-one negative slope of moderate magnitude. Although all of these year-two slopes are nonsignificant (either in themselves or in the context of the overall year-two test), they are of a magnitude sufficient to produce significant differences between year-one and year-two slopes when the changes in direction enter the computation.

In arithmetic achievement, black females show a significant positive year-one slope of large magnitude in Arithmetic Concepts while black males show a significant positive year-two slope of moderate magnitude in Arithmetic Computation. Black males also show a trend toward moderate year-one and year-two increases in Arithmetic Concepts, as evidenced by their positive year-one and year-two Arithmetic Concepts slopes, which are significant at the .05 level. Black males and black females show significant differences between year-one and year-two slopes in Arithmetic Computation and Arithmetic Concepts, respectively. These differences are accounted for primarily by changes in magnitude, with black males showing a positive year-two Arithmetic Computation slope of moderate magnitude after a small, nonsignificant, negative year-one slope and black females showing a zero slope for year-two Arithmetic Concepts after a large, positive year-one slope.

White males and females show significant negative year-one slopes of very large magnitude in Arithmetic Computation and significant differences between year-one and year-two slopes in Arithmetic Computation. These differences are accounted for by changes in slope magnitude, with white males showing a nonsignificant, positive year-two slope of small magnitude after a significant, negative year-one slope of very large magnitude and white females showing a zero year-two slope after a very large negative year-one slope. White males also show a trend toward a decline-recovery pattern in Arithmetic Concepts, as evidenced by a difference between the year-one and year-two Arithmetic Concepts slopes which is significant at the .05 level. (The year-one and year-two white male Arithmetic Concepts slopes are themselves nonsignificant.) This decline-recovery trend in Arithmetic Concepts is produced by changes in both magnitude and direction, with white males showing a year-two positive slope almost equal in magnitude to their negative year-one slope.

CHAPTER IV

DISCUSSION AND CONCLUSIONS

Discussion

In summary, both black males and black females show large, significant increases in Paragraph Meaning during the first year of desegregation. Black males alone show a moderate significant increase in Word Meaning and a moderate significant decline in Language during the first year. White males and white females also show moderate significant declines in Language during the first year; however, white males make some recovery in Language in the second year of desegregation. White males alone show moderate significant increases in Word Meaning during the first year, but these are offset by declines during the second. White females show a trend toward a similar increase-decline pattern in Word Meaning. Neither white males nor white females show significant changes in Paragraph Meaning achievement. In arithmetic, black females show large significant increases in Arithmetic Concepts during the first year of desegregation. This increase attenuates sharply during the second year. Black males show a moderate significant increase in Arithmetic Computation during the second year of desegregation and a

trend toward moderate increases in Arithmetic Concepts during both the first and second years. White males and females both show a very large significant decline in Arithmetic Computation during the first year of desegregation. These declines attenuate sharply during the second year. White males alone show a trend toward a decline-recovery pattern between year one and year two in Arithmetic Concepts.

With the exception of the Language subtest, these results are internally consistent within race. Overall, blacks show either significant increases in reading and arithmetic achievement or strong trends toward such increases. Overall, whites show significant declines in arithmetic achievement and a trend toward some decline in reading achievement. (The white male decline-recovery trend in Arithmetic Concepts is not strong enough to alter this general conclusion.) Language, however, behaves differently than the other reading measures, being the only test showing declines for both blacks and whites. Black males, white males, and white females all show significant first-year declines in Language. Although only black males are affected and although white males show signs of recovery during the second year, this anomalous year-one decline for both races merits discussion. The best explanation for the anomalous behavior of the Language subtest appears to be that it measures

non-reading skills and properly should not have been included as a measure of reading. While the Paragraph Meaning subtest is a measure of reading comprehension and the Word Meaning subtest a measure of vocabulary, the Language subtest is a measure of grammar and usage. Grammar and usage are not reading skills, strictly speaking, and thus the Language subtest does not behave as do the two reading subtests. Based on this consideration, it is the opinion of this researcher that the Language subtest is properly excluded when conclusions are drawn about black and white reading achievement. (However, it should be noted that inclusion would strengthen the case for concluding substantial declines in white reading achievement.)

The performance of blacks and whites on the Language subtest is interesting in and of itself. While one might speculate that the white declines in Language achievement are to be expected as the school proportion white decreases, the black male decline is unexpected and puzzling. It may be that black teachers in black schools have traditionally emphasized language skills in an effort to counteract the influence of "street language" on their students and that desegregation has brought less exposure to this emphasis for black children, not only because they are no longer taught exclusively by black teachers but because white teachers may be more tolerant of "black language" than are black teachers.

Although the results of this study are generally consistent within race, there is a sex-race interaction of considerable interest. The achievement slopes of white males and white females are quite similar in both direction and magnitude, and thus white males and females tend to show the same types of significant changes in achievement patterns. In contrast, the achievement slopes of black males and black females are similar in direction but often differ in magnitude, with black females generally having the smaller magnitude slopes. Thus, black females do not show significant changes in achievement patterns as often as do black males. Specifically, only in second year Language and first year Word Meaning do white males show significant changes that white females do not show. In contrast, black males show significant changes in first and second year Language, first year Word Meaning, second year Arithmetic Computation, and second year Arithmetic Concepts that black females do not show. (This contrast is particularly notable in the case of Language.) Based on these results, one might speculate that the achievement of black females is generally less susceptible to manipulation than is that of black males. This hypothesis is supported by Guertin (1973), who, while evaluating a compensatory education program for disadvantaged students, found that the "project program was successful in bringing about important changes in the male pupils in the fifth

grade, [but] benefits for the female subjects were not observed" (p. 56). These speculations about black male and female achievement differences (and about black and white Language achievement) are offered at this point not as hard and fast explanations of observed effects, but as interesting hypotheses for future research. Nevertheless, the likelihood of a sex-race interaction should be kept in mind when designing evaluations for compensatory programs and desegregation studies.

When the Language subtest is excluded for the reasons discussed above, examination of reading achievement for each race reveals that, overall, blacks show moderate to large increases in reading during the first year of desegregation and that whites, though variable, show no clear decline after desegregation. Examination of arithmetic achievement reveals that, overall, blacks show moderate to large increases in arithmetic growth during the first and second years of desegregation and that whites show a very large decline during the first year. Based on these results, the first research hypothesis, "the academic achievement of blacks increases with desegregation," is accepted, and the second research hypothesis, "the academic achievement of whites does not decline with desegregation," is rejected.

Conclusions

Given the results of this study, it is concluded that only the conventional assumption about black achievement gain is confirmed. Both the reading and arithmetic achievement of blacks clearly increase with desegregation. The assumption about the stability of white achievement is not confirmed. Contrary to expectation, white arithmetic achievement declines with desegregation, and white reading achievement shows a similar (albeit slight and not conclusive) trend. In other words, under conditions of court-ordered desegregation which is imposed by means of "forced" busing on a resisting white populace, black reading and arithmetic achievement clearly increase, but white arithmetic achievement clearly declines.

Appropriate caution must be exercised both in drawing and generalizing from this conclusion. The lack of a control or comparison group weakens the internal validity of the design by failing to control for history. Thus, these results, i.e., increases in black achievement and declines in white achievement, may be due to some other specific event than desegregation or may be the historical achievement patterns through grades four and five for blacks and whites in Jacksonville (or in similar cities). However, this researcher is neither aware of any specific event that might explain these effects nor knows of any research indicating that black increases and white declines

constitute the historical achievement pattern through grades four and five. In addition, the change in forms of the SAT across the three grades tested may have biased the results in some manner. However, these changes in test forms should produce changes of like direction for blacks and whites rather than the changes of opposite direction that are observed. Finally, generalizability is limited by the nature of the sample to upper elementary students of low average ability, relatively low academic performance, and low to moderate estimated family income levels in the urban South.

The question of whether these black gains and white declines are due to the changes in type of school peers and/or level of proportion white experienced by both races, i.e., a classroom peer composition effect, or to the trauma of the general systematic disruption of the first year of desegregation remains unanswered by this study. Based on the EEOS (Coleman, 1966; U.S. Commission on Civil Rights, 1967) findings, it seems likely that it is indeed this classroom peer composition effect that is operating. With desegregation, Jacksonville blacks came into contact with, generally speaking, school peers of higher socio-economic status, higher ability and a higher achievement level than themselves. In addition, the level of proportion white experienced by blacks increased. In contrast, whites came into contact with, generally speaking, peers of lower

socio-economic status, lower ability, and a lower achievement level than themselves. In addition, the level of proportion white experienced by whites decreased. Given the court order, it is safe to assume that these changes were experienced by both races at the school, grade, and classroom levels. Unlike many other districts that have been the subject of research studies which failed to find a negative effect on white achievement, Jacksonville experienced desegregation of all students. Desegregation was not limited to those blacks who volunteer to be bused and those whites who volunteer to accept them, or those blacks who are affluent enough to live within or contiguous to a white neighborhood. Further, school proportion black in Jacksonville has increased to at least 24% by order of the court, and, in most cases, is in reality closer to 30% or better. Many of the other cities studied have held school proportion black to around 15%. Nevertheless, although the case in favor of the classroom peer composition effect appears plausible, it must be emphasized that it is not conclusive. Generally speaking, little or no significant change in either black or white achievement is seen during the second year. This could suggest equally either a classroom peer composition effect that stabilizes during the second year of desegregation or a first year trauma effect that simply attenuates during the second year.

Further, while these effects have important and differing implications as predictors of the duration and permanency of the observed black gains and white losses, neither is completely satisfactory as an explanation of the root cause of these changes. Although the classroom peer composition effect does have special etiological appeal, it is not entirely satisfying as a causal supposition. Can it indeed be that academic performance is so delicate that a simple change in classroom peer composition or a short-lived systematic disruption, however traumatic, alone sends test scores plummeting and rising so dramatically? In light of this question, this researcher made a cursory examination of the data for possible aptitude-treatment interaction.

Using third grade scores on the Paragraph Meaning and Arithmetic Computation subtests, subjects in the first and fourth z-score quartiles on these subtests were extracted from the sample. (The number of subjects in each quartile is shown in Table A-10.) Using Biomedical Computer Program 02D (Dixon, 1970), mean z-scores were then calculated on these subtests for these subjects across grades three, four, and five and plotted. Z-score means are shown in Table A-11 and plots in Figures 6 and 7.

As Figure 6 shows, there is clearly an aptitude-treatment interaction for whites on Paragraph Meaning. The first quartile whites show gains while the fourth quartile

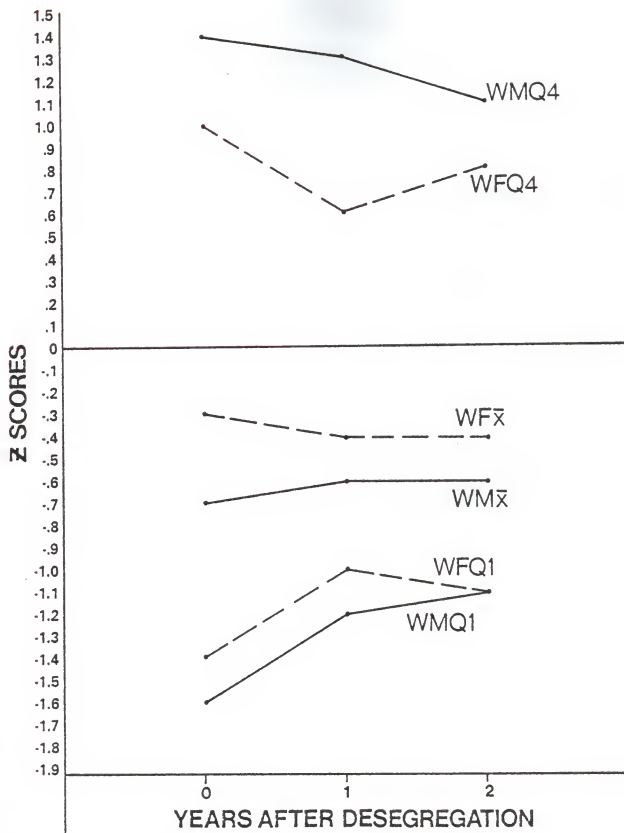


Figure 6. Means for Paragraph Meaning,
Grade 3 Quartile 1 and 4 Subjects

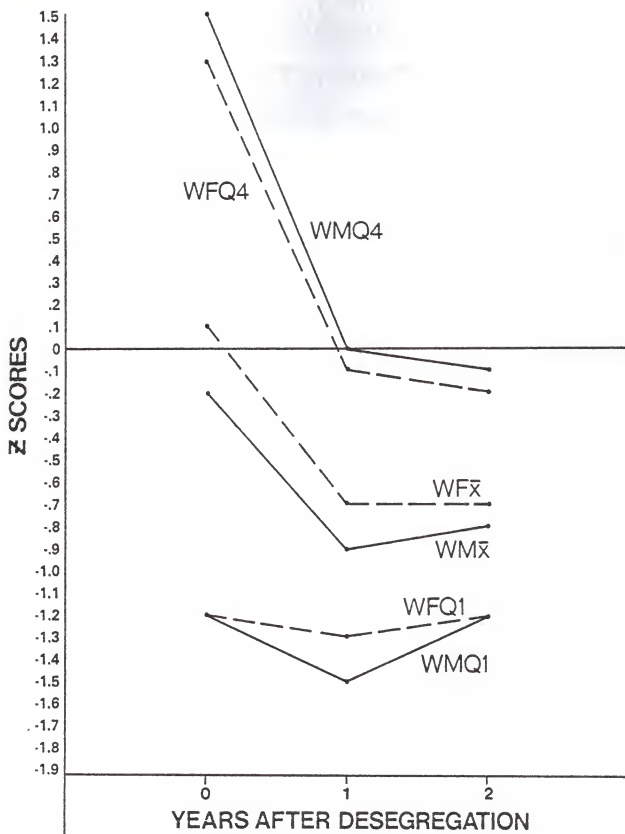


Figure 7. Means for Arithmetic Computation,
Grade 3 Quartile 1 and 4 Subjects

whites show losses. These white gains and losses average to produce the almost flat slopes seen earlier in Figure 1 and reproduced in Figure 6. First quartile blacks, however, do not differ notably from the overall black means shown in Figure 1. (There were not enough fourth quartile blacks to analyze.) Further, although the general levels of achievement for first quartile whites are somewhat higher than those of first quartile blacks, the first quartile whites show patterns of achievement that are strikingly similar to those of the first-quartile blacks. As Figure 7 shows, there is also an aptitude-treatment interaction for whites in Arithmetic Computation. Fourth quartile whites show dramatic year-one losses in Arithmetic Computation. While first quartile whites also show year-one losses, they are almost negligible by comparison and are offset by year-two gains. Again, first quartile blacks do not differ notably from the overall black Arithmetic Computation means, shown in Figure 4. (There were not enough fourth quartile blacks to analyze.) And, although the first quartile whites show slightly higher levels of achievement than the first quartile blacks, there is a striking similarity of achievement patterns between the two. Both show slight year-one losses that are offset or slightly bettered (in the case of black males) during year two.

These aptitude-treatment interactions, especially the similarities between first quartile blacks and whites, suggest that a teaching or instructional effect may be the root cause of the observed white losses and black gains. With desegregation, the number and proportion of low achievers in a classroom may typically shift in such a way that teachers are forced to concentrate their teaching energies and effects on the low achievers. The high achievers, i.e., those who can "get along," may consequently suffer. This teaching effect may also be the basis underlying Coleman's (1966) formulations about the importance of classroom peer composition.

Future research should concentrate on determining whether the observed black and white achievement patterns are accounted for by the first year trauma effect, the classroom peer composition effect, the teaching/instruction effect, or some combination of these three. In addition, the observed decreases in black and white Language achievement and the differences between black males and black females in sensitivity to factors affecting achievement should be investigated.

CHAPTER V

SUMMARY

This study investigates the fundamental, generally held assumption that desegregation raises black achievement levels while at the very least having no negative effect on white achievement. This assumption is tested under the condition of court-ordered desegregation which was resisted by the white populace and accomplished by means of intensive "forced" busing. Achievement is limited to reading and arithmetic achievement of upper elementary students during their first and second years of desegregation.

A single-group longitudinal design is used, and the reading and arithmetic achievement patterns of black males, black females, white males, and white females during their first (grade four) and second (grade five) years of desegregation are analyzed separately. Conclusions concerning changes in black and white achievement are drawn on the basis of the performance of both males and females. Reading and arithmetic achievement are measured by national percentile scores on the Paragraph Meaning, Word Meaning, Language, Arithmetic Computation, and Arithmetic Concepts subtests of the SAT. Achievement is measured at three

points in time for every subject, i.e., the end of grade three (the year prior to desegregation), the end of grade four (the first year of desegregation), and the end of grade five (the second year of desegregation). Since rates of growth in achievement after desegregation are of interest in this study, null hypotheses about the reading and arithmetic performances of blacks and whites are formulated in terms of year-one and year-two achievement slopes. The null hypotheses are tested using the t-ratio. Since there are three measures of reading, two of arithmetic, and two subgroups (sex) within each racial group, multiple t-ratios are computed in testing any given null hypothesis. Therefore, Levitt's (1961) procedure for determining the probability of finding one or more statistics significant by chance when multiple statistics are computed is used to obtain an overall test of the null hypothesis. Upon rejection of a null hypothesis, the appropriate individual subtests are examined to determine the nature, direction, and magnitude of the particular changes in achievement that led to rejection. The research hypotheses themselves are then rejected or accepted based upon these specific changes in achievement.

A sample of 444 students who had been desegregated in September, 1972, as they entered grade four was drawn from the population of students attending grade six during April-May, 1975. Fifteen subjects who did not have scores

on all five subtests for all three years were omitted, leaving a sample of 429 (102 black males, 106 black females, 110 white males, 111 white females). The sample is of low average IQ, low reading and arithmetic achievement level, and low estimated family income level and appears to be acceptably representative of the population.

The national percentile scores for each subject were first converted to z-scores. Z-scores means were then computed for black males, black females, white males, and white females on each of the five subtests and entered into the computation of the t-ratios. Finally, Levitt's (1961) procedure is applied to the appropriate set of t-ratios to evaluate each null hypothesis. Results of the overall tests of the null hypotheses showed that the reading and arithmetic achievement of both blacks and whites changes, and that, with the single exception of black arithmetic achievement, all significant change occurs during the first year of desegregation. In addition, with the single exception of black reading achievement, there is a difference between year-one and year-two achievement.

Examination of the individual reading subtests reveals that both black males and black females show large increases in Paragraph Meaning during the first year of desegregation, and that black males alone show a moderate year-one increase in Word Meaning. White males also show moderate

increases in Word Meaning during the first year, but these are offset by declines during the second. White females show a trend toward a similar increase-decline pattern in Word Meaning. On the Language subtest, black males, white males, and white females all show moderate declines during the first year. (However, white males appear to make some recovery during the second.) Because of this anomalous decline of both blacks and whites during the first year, it is concluded that the Language subtest does not measure reading skills as such as do the Paragraph Meaning and Word Meaning subtests and is therefore properly excluded from consideration in drawing conclusions about black and white reading achievement. However, the anomalous achievement pattern of black males, white males, and white females in Language is of interest in itself, particularly the black male decline. This may indicate that blacks are subject to less intensive Language instruction after desegregation, partly because they are no longer taught exclusively by black teachers who emphasized Language instruction in an attempt to counteract the influence of "street language" and partly because white teachers are perhaps generally more tolerant of "black language."

Examination of the individual arithmetic subtests reveals that black females show a large increase in Arithmetic Concepts during the first year of desegregation, which attenuates sharply during the second year. Black

males show a trend toward moderate increases in Arithmetic Concepts during both the first and second years and a moderate increase in Arithmetic Computation during the second year. White males and females both show very large declines in Arithmetic Computation during the first year, which attenuate sharply during the second. White males alone show a trend toward a decline-recovery pattern in Arithmetic Concepts.

Examination of the reading performance of each race (excluding Language performance) reveals that, overall, blacks show increases in reading achievement during the first year of desegregation and that whites, although variable, show no conclusive trend in either direction. Examination of the arithmetic performance of each race reveals that, overall, blacks show increases in arithmetic achievement during the first and second years of desegregation and that whites show a very large decline during the first year. While these results are generally consistent within each race, there is a sex-race interaction of interest. The pattern of significant changes in achievement is generally different for black males and black females, with the females showing notably fewer significant changes in achievement. It appears that the achievement of black females is generally less susceptible to manipulation than is that of black males. Based on these results, the first research hypothesis, "the academic

achievement of blacks increases with desegregation," is accepted, and the second research hypothesis, "the academic achievement of whites does not decline with desegregation," is rejected.

Given these findings, it is concluded that only the conventional assumption about black achievement gain is confirmed. Black achievement does indeed increase with desegregation. The assumption about the stability of white achievement is not confirmed. Contrary to expectation, white arithmetic achievement declines with desegregation. Appropriate caution must be exercised both in drawing and generalizing from these conclusions. The lack of a control group weakens the internal validity of the design by failing to control for history. However, this researcher knows of no historical event that could account for these results. In addition, the change in forms of the SAT may have biased the results in some manner. However, these changes in test level should produce changes of like direction for blacks and whites rather than the changes of opposite direction that are observed. Finally, generalizability is limited by the nature of the sample to upper elementary students of low average ability, relatively low academic performance, and low to moderate estimated family income levels in the urban South.

The question of whether these findings are due to the changes in type of school peers and level of proportion

white experienced by each race, i.e., a classroom peer composition effect, or to the general systematic disruption of the first year of desegregation remains unanswered by this study. Based on the EEOS findings (Coleman, 1966; U.S. Commission on Civil Rights, 1967), it seems likely that the classroom peer composition effect is indeed operating. Nevertheless, the first year trauma effect cannot be discounted.

Further, neither the classroom peer composition effect nor the first year trauma effect are entirely adequate as explanations of the root cause of the observed black gains and white losses. A cursory examination of Paragraph Meaning and Arithmetic Computation data for aptitude-treatment interaction shows that such interaction is present for whites and that first quartile whites and blacks have strikingly similar patterns of achievement. This suggests that a teaching/instructional effect, which appears to be more etiologically powerful than either the classroom peer composition or trauma effects, may be the root cause of the observed black gains and white losses. In other words, instructional changes which produce greater and more methodologically appropriate teacher focus on low achievers, and a consequent neglect of high achievers, may be endemic to the type of desegregation studied here.

Future research should concentrate on determining whether the trauma effect, the classroom peer composition

effect, the teaching/instructional effect or some combination of the three is operating. In addition black and white Language achievement and the differences between black males and black females in sensitivity to factors affecting achievement should also be investigated.

Appendix A

Table A-1. Percent Free and Reduced Lunch,
February, 1975, 6th Grade Centers

	Sampled Centers	Non-Sampled Centers	All Centers
Mean	55.36	57.84	56.60
Median	53.57	56.01	54.16
Range	42.48-75.33	41.74-80.31	41.74-80.31

Table A-2. Number of Sample Attending Schools with
Title I Reading and Math Programs

Group	Grade			
	4		5	
	Reading Only	Reading and Math	Reading Only	Reading and Math
Black Males	1	2	5	19
Black Females	1		1	13
White Males	1	2	3	22
White Females		1	2	19

Table A-3. Mean IQ Scores, Cognitive Abilities Test
Multi-Level Edition, Form 1

Group	IQ SCORE		
	Verbal	Quantitative	Non-Verbal
Black Males	79.77	81.78	81.76
Black Females	86.26	85.45	86.20
White Males	91.51	94.72	92.97
White Females	98.85	98.85	97.91
All	89.32	90.42	89.91

Table A-4. National Percentile Means

Group	Subtest	GRADE		
		3	4	5
Black Male	Word Mean	13.51	16.01	16.05
	Para. Mean	9.84	13.60	15.65
	Lang.	14.45	9.44	9.65
	Arith. Comp.	13.66	10.28	15.39
	Arith. Conc.	15.26	19.44	23.81
Black Female	Word Mean	18.45	18.46	17.33
	Para. Mean	13.33	19.62	20.91
	Lang.	15.32	17.02	15.72
	Arith. Comp.	19.00	17.85	18.32
	Arith. Conc.	16.54	25.01	24.20
White Male	Word Mean	34.89	37.15	35.59
	Para. Mean	31.98	32.82	32.59
	Lang.	33.62	26.78	29.58
	Arith. Comp.	42.47	25.78	25.78
	Arith. Conc.	43.85	40.18	43.54
White Female	Word Mean	39.58	39.64	32.64
	Para. Mean	40.50	37.15	38.09
	Lang.	45.79	40.02	40.68
	Arith. Comp.	52.13	29.06	29.18
	Arith. Conc.	44.14	39.14	37.05

Table A-5. National Percentile Standard Deviations

Group	Subtest	GRADE		
		3	4	5
Black Male	Word Mean	18.26	17.67	16.93
	Para. Mean	16.93	14.04	15.61
	Lang.	15.55	11.57	13.47
	Arith. Comp.	17.13	11.36	15.18
	Arith. Conc.	18.00	17.89	18.16
Black Female	Word Mean	22.35	17.32	19.01
	Para. Mean	18.38	17.41	17.75
	Lang.	16.83	21.16	17.96
	Arith. Comp.	19.46	18.90	17.82
	Arith. Conc.	20.15	21.30	19.57
White Male	Word Mean	29.67	30.31	29.45
	Para. Mean	30.05	29.95	27.72
	Lang.	28.52	28.42	28.93
	Arith. Comp.	32.07	25.40	23.83
	Arith. Conc.	29.24	31.26	24.61
White Female	Word Mean	26.29	26.50	24.41
	Para. Mean	25.79	24.74	24.82
	Lang.	26.47	28.90	25.07
	Arith. Comp.	29.09	23.73	23.01
	Arith. Conc.	26.78	25.13	20.30

Table A-6. Estimated Family Income Levels

Group	\$3600- \$5999	\$6000- \$8599	\$8600- \$9999	\$10,000- \$12,599	\$12,600- \$15,999	\$15,600+
Blacks	102	50	39	15	1	1
Whites	1	65	93	41	15	6
All	103	115	132	56	16	7

Table A-7. Percent Black, Grades 1-6,
1971-1974

School Year	Grade						1-6
	1	2	3	4	5	6	
1974-75	32	32	32	32	31	35	32
1973-74	33	32	32	31	31	36	32
*1972-73	33	33	32	31	31	39	33
1971-72	34	33	31	30	31	32	32

* Sixth grade centers established.

Table A-8. Private School Enrollment, Grades 1-6,
As a Percent of Total Enrollment Grades 1-6

School Year	Grade					
	1	2	3	4	5	6
74-75	16	14	15	14	15	26
73-74	15	14	14	15	16	26
*72-73	14	14	14	14	15	29
71-72	17	16	15	15	16	21

*Sixth grade centers established.

Table A-9. National Percentile Scores, All Subjects

White Male

Grade 3					Grade 4					Grade 5				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
56	58	58	24	76	32	46	10	8	86	66	42	36	1	46
20	18	24	20	22	22	11	34	2	23	4	16	16	2	38
1	4	32	2	2	6	1	8	16	40	6	8	6	6	23
20	40	16	44	42	36	68	14	1	40	22	4	32	22	11
96	86	58	98	98	96	94	64	76	94	50	38	56	78	90
11	26	14	18	38	22	26	8	8	4	26	11	12	28	23
10	1	16	32	18	18	2	6	1	18	22	14	8	34	11
20	6	6	1	10	32	28	4	4	4	6	22	1	8	11
11	20	38	28	32	14	14	6	46	23	11	22	14	50	38
26	32	50	60	38	32	23	32	50	44	30	32	46	16	23
34	5	36	18	32	2	4	11	8	40	1	14	8	8	38
68	74	82	40	58	68	36	36	40	34	54	72	74	40	56
4	4	4	14	8	11	6	1	16	12	1	11	1	28	4
23	1	6	18	22	18	4	4	16	4	14	14	4	8	30
6	8	12	18	10	32	40	10	12	50	46	6	6	34	46
1	23	2	60	50	6	14	2	16	8	18	6	2	40	68
56	18	16	44	64	28	28	11	16	66	30	14	18	11	56
4	10	1	24	58	12	14	8	8	66	8	4	8	11	56
38	26	36	28	68	22	10	6	4	44	18	6	28	16	30
2	10	4	95	32	6	6	6	72	86	36	10	6	34	16
10	5	4	24	1	18	16	2	6	8	26	1	4	8	23
10	4	10	18	38	24	20	14	16	23	58	30	11	34	11
98	82	38	84	42	96	88	58	24	34	96	84	56	8	74
84	40	52	80	54	22	10	10	1	18	50	30	62	11	82
72	89	52	60	64	80	62	26	50	40	36	54	76	34	46
2	1	12	2	1	6	8	1	8	18	4	16	6	8	50
14	16	42	28	44	14	10	2	16	18	1	14	6	28	38

Table A-9 (continued)
White Male (continued)

Grade 3					Grade 4					Grade 5				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
38	26	26	50	54	1	11	1	12	1	8	8	38	11	30
2	6	32	10	10	11	10	11	2	8	22	14	2	28	2
11	26	22	50	42	6	40	18	30	60	6	24	6	4	46
2	1	1	8	12	4	6	4	1	4	18	4	14	8	23
16	11	22	32	32	1	11	18	12	12	6	38	6	4	30
62	62	32	89	72	44	36	18	24	80	46	46	48	28	62
38	42	32	89	80	32	52	34	46	60	32	38	48	70	23
32	26	6	20	50	40	46	1	16	34	26	24	11	8	38
44	2	28	28	26	24	10	2	8	34	4	6	11	46	86
2	18	16	96	50	8	4	18	16	2	22	26	14	70	38
4	6	12	8	1	6	6	1	8	8	6	14	11	8	30
16	10	12	24	2	22	36	6	1	34	22	4	4	8	30
6	10	4	24	10	28	14	4	12	44	2	1	2	1	30
1	1	6	23	1	14	16	1	2	8	11	6	12	6	30
50	4	16	68	54	50	6	14	24	50	32	18	28	70	56
78	62	60	76	86	72	96	58	10	66	77	78	68	11	68
78	89	90	94	96	99	96	78	34	96	90	94	74	70	88
38	26	32	44	42	32	8	8	20	2	14	6	22	16	46
6	1	14	1	1	6	6	4	8	2	30	26	10	4	23
10	11	12	10	26	28	14	14	20	4	22	6	12	8	46
6	2	22	24	38	14	10	48	24	66	18	4	10	2	56
96	78	68	94	76	96	74	80	80	82	77	76	54	56	23
56	32	70	60	80	68	74	70	20	74	70	54	60	6	62
16	4	2	10	4	11	11	1	1	12	6	4	10	8	4
68	10	36	24	50	50	11	28	10	74	74	42	44	16	62
1	1	16	10	12	12	6	1	20	23	4	4	1	28	46

Table A-9 (continued)

White Male (continued)

Grade 3					Grade 4					Grade 5				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
32	58	58	32	64	32	28	26	46	50	30	42	56	70	50
56	58	60	60	60	84	94	46	66	80	80	58	72	78	90
16	11	6	1	2	11	11	11	1	2	2	11	11	4	11
50	32	54	76	94	80	68	40	30	70	80	30	11	11	50
56	66	42	68	46	44	34	48	24	23	6	10	4	8	23
20	18	32	50	32	8	34	4	30	8	22	16	4	16	46
4	1	16	18	26	14	10	1	1	40	6	10	4	8	23
56	26	32	50	32	12	1	10	8	12	18	14	12	2	4
50	36	36	92	68	76	64	32	12	80	58	68	60	16	56
11	11	2	18	46	22	8	32	40	74	14	34	4	28	23
16	40	28	68	82	12	26	4	20	44	30	38	1	16	50
56	70	74	84	88	84	86	74	80	98	80	66	76	46	94
38	40	74	90	80	32	41	62	16	60	86	54	36	34	78
44	10	70	68	50	54	20	32	24	66	59	80	72	25	49
88	99	96	98	99	96	99	99	99	96	90	99	98	70	99
26	40	28	20	36	24	26	62	34	44	11	50	30	11	16
78	89	90	99	88	76	86	82	66	80	96	86	98	46	50
96	78	76	96	80	90	84	96	89	70	74	86	92	40	50
26	46	38	86	60	40	34	50	62	60	50	32	30	8	68
38	58	94	60	60	90	62	70	76	92	70	52	38	22	56
88	99	94	99	94	90	99	62	89	99	96	98	98	89	99
38	4	32	50	30	22	6	11	6	4	30	16	1	6	38
8	22	4	36	18	22	14	46	40	50	18	10	4	11	46
8	1	1	1	2	24	10	1	4	8	8	6	6	8	56
56	62	58	40	46	76	76	32	56	86	54	58	42	16	23
96	99	92	99	94	96	98	96	66	94	96	88	99	99	98
50	58	82	18	30	40	23	60	4	23	18	40	48	11	23
84	82	82	76	80	94	89	89	72	90	96	78	94	16	78

Table A-9 (continued)
White Male (continued)

<u>Grade 3</u>					<u>Grade 4</u>					<u>Grade 5</u>				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
84	82	82	76	80	94	89	89	72	90	96	78	94	16	78
56	62	36	60	80	54	34	6	46	50	32	22	20	16	30
1	6	1	6	18	14	11	18	2	12	26	10	8	11	56
20	23	1	2	12	2	4	1	6	4	4	1	2	6	16
78	70	76	86	80	99	62	60	34	74	88	68	66	64	62
16	11	2	18	30	22	14	1	1	1	14	22	10	6	6
1	1	6	1	1	14	8	10	1	12	4	6	4	11	16
1	1	1	24	12	14	2	1	6	1	2	6	2	8	56
4	4	2	8	42	8	1	2	24	2	11	10	10	11	16
8	6	4	1	10	18	11	1	1	12	18	24	11	6	4
23	46	28	24	42	8	8	6	10	23	32	26	50	28	50
99	96	64	96	94	96	90	82	34	82	98	94	72	50	68
56	70	64	18	22	58	56	18	8	12	46	42	46	46	38
32	18	22	10	22	36	42	32	6	23	36	34	16	11	38
56	11	36	96	94	22	26	11	62	60	36	11	26	82	92
20	2	12	10	30	22	11	11	6	8	50	32	4	11	11
1	20	42	18	18	28	23	8	16	1	18	22	12	8	38
1	1	2	1	1	6	14	1	10	12	2	1	1	11	6
44	42	36	28	42	68	76	50	20	50	58	60	34	28	46
38	23	6	14	58	24	28	23	12	44	36	64	34	64	68
10	2	2	14	8	6	8	4	8	2	4	4	4	11	30
68	58	90	24	30	80	68	46	24	50	46	54	58	11	56
16	6	4	32	80	22	26	4	16	2	14	22	10	4	30
11	23	6	18	32	28	11	20	12	40	11	46	38	50	23
88	92	84	68	98	76	62	89	90	92	84	92	86	76	94
56	36	50	96	54	50	4	6	66	66	50	58	24	28	46
74	82	92	44	76	94	78	98	62	92	96	78	92	78	68
62	70	32	50	54	68	40	56	20	23	66	54	62	22	56
1	2	12	18	8	11	10	4	4	8	30	8	2	22	56
38	46	24	86	60	40	52	64	66	74	40	24	26	40	50

Table A-9 (continued)

White Female

<u>Grade 3</u>					<u>Grade 4</u>					<u>Grade 5</u>				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
1	1	32	1	1	11	6	1	1	2	1	4	1	1	11
56	66	64	18	36	72	56	58	16	70	46	82	64	28	30
62	66	82	68	48	36	52	74	30	23	26	34	64	6	46
16	6	6	44	10	32	30	23	12	23	4	14	6	8	23
23	36	16	28	36	68	23	23	30	40	30	50	62	11	30
38	42	38	68	18	40	30	60	16	40	46	26	32	11	6
23	26	68	68	36	6	23	28	10	4	6	11	11	11	50
1	6	28	24	2	32	14	4	6	12	8	4	6	8	16
16	10	24	96	64	11	14	23	24	50	8	4	14	16	46
38	32	58	68	36	22	42	23	24	44	32	34	54	8	56
38	26	38	24	38	50	23	11	1	8	50	24	14	2	38
44	50	54	50	50	24	11	40	30	40	30	22	6	8	38
50	46	32	40	1	36	30	18	2	1	6	26	54	28	30
10	10	12	4	1	18	8	4	4	18	46	14	24	4	16
26	84	28	14	34	36	28	23	12	50	30	42	11	11	30
20	14	28	1	1	14	2	2	6	8	6	10	1	6	11
6	10	12	50	8	18	10	10	12	12	1	10	6	28	30
23	23	72	44	12	36	28	48	4	12	14	10	28	1	23
16	50	32	32	58	12	23	48	20	44	54	24	18	6	62
32	26	16	20	8	14	20	23	4	8	6	22	8	1	23
50	6	32	60	68	22	8	40	16	1	70	30	48	50	62
50	36	50	76	18	36	1	28	50	1	6	18	56	46	11
68	62	74	96	76	50	36	89	46	74	22	11	6	46	62
2	5	4	36	2	14	10	1	4	12	4	16	2	11	4
26	46	68	89	72	18	52	12	50	70	62	40	36	70	23
44	26	36	20	68	32	36	56	30	34	36	11	28	11	16
8	42	16	32	12	12	28	23	20	18	11	6	34	4	38
74	42	68	50	76	44	46	42	4	50	32	60	40	56	30
62	42	74	80	54	54	64	58	34	44	40	22	50	28	46

Table A-9 (continued)
White Female (continued)

Grade 3					Grade 4					Grade 5				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
88	86	88	89	80	68	58	74	62	74	66	64	66	28	68
10	18	50	24	22	8	42	18	16	23	4	26	32	6	16
11	6	6	14	8	18	14	14	30	34	2	11	20	34	38
26	26	16	50	10	14	16	26	20	40	18	16	16	8	23
1	1	4	89	38	22	6	18	24	40	8	6	10	8	30
32	46	36	36	22	32	16	38	12	23	11	40	32	6	38
38	36	70	86	32	24	34	36	16	60	20	42	48	68	50
74	86	60	90	76	28	28	64	62	34	30	52	78	28	50
26	14	12	18	30	11	16	26	12	44	36	6	24	11	16
88	82	54	92	86	44	70	70	46	70	30	76	82	70	62
4	50	42	18	36	44	34	26	10	1	30	42	56	8	38
11	6	2	18	30	14	8	10	4	23	32	8	10	4	11
20	23	2	1	4	22	2	4	16	23	14	14	6	8	16
23	32	22	14	18	8	46	26	10	18	14	24	1	16	23
62	50	60	96	64	22	36	74	34	23	50	54	76	34	16
26	50	74	60	90	68	50	90	24	80	46	54	48	11	62
84	66	38	98	60	58	36	80	34	66	32	54	56	40	23
44	52	42	40	64	40	82	54	72	70	74	64	64	76	56
50	42	36	76	76	22	4	10	46	18	6	18	1	16	30
16	2	6	76	46	6	16	6	2	34	14	8	26	28	30
84	78	92	50	94	96	89	99	62	74	80	76	82	70	90
50	78	78	50	64	76	28	12	6	40	46	66	40	50	46
8	8	10	20	10	14	30	18	24	2	2	10	11	16	16
26	40	58	50	58	28	14	11	6	4	36	58	52	16	23
8	10	54	14	1	1	1	1	1	18	8	26	10	11	23
4	6	14	14	18	18	28	11	12	40	11	10	8	8	46
11	23	50	14	54	28	64	66	12	40	11	34	36	22	30
56	46	54	36	36	32	28	12	4	1	26	22	30	22	11
56	32	52	50	50	22	10	10	6	4	32	42	64	8	30

Table A-9 (continued)
White Female (continued)

Grade 3					Grade 4					Grade 5				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
44	20	28	76	30	22	40	54	20	12	36	46	60	16	46
32	46	38	68	60	50	46	8	20	1	58	30	34	28	16
50	23	22	10	4	28	6	6	12	12	30	14	32	22	50
68	74	82	98	86	76	68	74	89	74	32	58	92	50	38
84	89	96	89	96	90	94	99	99	99	88	92	99	96	99
6	11	42	98	32	54	52	12	34	12	22	30	42	50	56
6	6	12	24	12	58	40	12	46	2	6	42	16	50	46
74	50	74	76	80	68	84	92	24	70	50	52	74	34	50
88	82	96	76	64	68	70	84	20	82	84	58	76	8	50
50	66	32	68	36	68	50	26	12	8	70	22	52	40	38
56	58	68	68	50	94	42	14	24	66	14	66	60	16	68
44	62	74	28	54	54	74	80	84	60	50	82	76	78	46
6	6	12	4	1	18	28	4	12	18	26	14	12	8	16
16	32	42	68	50	14	34	14	20	40	32	52	46	46	50
10	14	6	14	18	14	16	23	12	34	11	32	24	40	16
44	40	70	36	82	50	46	56	76	80	30	52	56	34	50
38	36	32	60	26	40	36	38	50	46	22	18	48	70	23
2	2	10	60	30	8	8	8	30	50	32	30	14	34	46
56	20	50	68	30	14	30	28	50	50	8	14	24	6	46
38	36	50	92	30	58	16	46	80	44	74	26	58	56	38
88	82	64	50	36	90	82	77	2	34	84	82	46	50	30
38	46	74	44	76	14	14	44	24	40	58	38	40	46	16
1	1	2	20	18	1	1	4	1	44	6	8	22	16	38
56	42	24	28	36	12	28	32	30	18	22	42	48	8	4
88	70	74	80	76	94	64	80	40	74	70	82	64	22	62
88	92	92	98	68	72	88	88	46	80	77	96	92	50	68
62	82	58	50	64	90	52	76	16	66	50	46	52	4	30
88	92	76	1	90	96	68	70	16	23	54	82	64	28	30
20	46	64	44	50	58	42	76	76	44	50	42	56	50	30

Table A-9 (continued)
White Female (continued)

Grade 3					Grade 4					Grade 5				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
44	70	86	89	82	54	58	74	34	60	50	80	60	56	56
74	52	78	94	76	68	68	77	62	60	66	54	54	50	46
38	14	38	44	32	14	52	60	24	18	11	16	56	11	38
88	86	99	99	88	96	90	96	96	98	98	99	99	94	88
16	23	10	60	42	44	70	56	56	44	30	32	50	11	30
26	54	54	44	68	58	82	82	46	74	62	72	94	28	68
45	48	35	50	20	18	16	14	10	34	54	58	34	22	62
56	86	86	50	88	94	99	96	84	82	98	99	78	50	30
23	32	24	20	22	50	11	32	16	40	18	38	42	1	62
16	32	11	64	18	22	23	10	24	40	4	24	22	1	4
11	2	28	60	64	1	26	8	24	23	4	4	30	64	30
88	52	60	50	68	58	84	60	34	82	40	64	68	11	62
38	40	60	68	38	72	23	36	50	40	6	32	20	34	2
62	52	78	20	58	58	50	48	10	44	50	52	38	34	68
56	42	38	90	42	32	40	46	24	44	28	66	24	40	28
38	40	60	68	38	72	23	36	50	40	6	32	20	34	2
38	40	54	60	30	44	34	23	66	34	22	52	44	40	30
50	66	76	60	68	50	56	54	24	60	56	50	68	82	90
62	66	68	94	68	32	42	48	46	23	26	30	44	40	16
78	82	78	99	80	88	70	80	46	60	50	64	60	70	50
10	11	16	40	32	12	4	6	12	44	1	8	20	40	38
38	58	32	76	58	24	30	34	24	40	18	38	40	46	23
74	58	64	18	68	84	52	70	20	70	46	72	58	22	38
23	32	42	89	46	24	42	74	76	74	11	40	44	46	38

Table A-9 (continued)

Black Male

<u>Grade 3</u>					<u>Grade 4</u>					<u>Grade 5</u>				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
4	1	12	2	2	6	14	8	1	34	18	1	1	6	11
38	70	36	50	36	90	64	36	30	34	80	78	76	28	38
10	20	2	24	12	4	30	60	20	24	8	10	8	8	16
1	1	6	2	4	1	1	1	1	1	1	1	1	2	6
1	4	1	24	2	1	4	1	4	1	2	11	8	4	16
38	6	4	20	18	18	10	11	4	23	4	4	6	22	4
8	1	2	2	1	6	14	2	6	8	30	4	1	22	50
8	1	16	1	2	12	10	1	1	8	4	8	4	1	46
11	1	11	11	14	8	1	8	6	34	26	2	11	8	4
1	1	24	4	10	14	16	4	10	18	4	14	1	8	23
1	1	32	18	8	6	10	2	12	34	6	10	1	1	1
2	1	1	1	2	6	8	4	10	50	22	2	4	1	46
4	1	2	1	2	12	8	4	1	2	18	10	1	11	23
8	6	28	6	14	6	6	2	1	23	8	22	6	34	78
23	10	28	4	2	22	50	14	4	23	20	2	14	20	18
6	10	10	8	1	2	4	1	1	8	14	26	1	1	11
10	10	1	28	2	8	34	10	30	23	32	6	16	56	46
4	1	10	6	30	12	4	6	2	23	1	4	4	22	30
16	32	32	20	18	12	2	20	10	12	50	11	14	4	23
16	32	6	8	18	8	10	2	20	50	36	40	14	8	11
62	58	50	50	54	14	16	10	24	66	14	8	6	34	30
2	1	28	1	12	24	10	1	1	40	22	2	2	16	38
1	1	2	1	1	18	14	1	2	8	6	14	2	22	16
8	23	4	24	36	18	36	11	34	4	26	40	24	70	23
1	1	2	2	1	14	4	4	1	1	4	4	4	4	2
38	50	14	24	22	32	4	32	46	12	26	11	14	6	30
1	1	1	1	1	12	6	1	4	8	1	1	1	6	6
1	1	32	2	4	8	16	1	1	1	6	6	1	6	23

Table A-9 (continued)
Black Male (continued)

Grade 3					Grade 4					Grade 5				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
26	14	38	56	10	14	8	20	10	44	11	10	6	2	16
6	1	24	1	4	28	6	2	8	12	6	6	1	16	23
16	4	32	24	64	4	6	2	8	12	4	4	1	22	16
6	1	6	10	2	36	10	23	10	60	11	4	1	6	11
16	8	12	20	10	14	1	4	6	18	8	10	4	16	74
4	5	12	7	1	8	23	8	6	34	6	26	4	4	1
1	1	12	60	4	1	2	2	10	34	4	1	1	46	30
1	1	1	1	1	8	1	1	1	12	27	20	20	38	52
50	58	60	76	64	44	20	28	10	8	80	34	28	11	23
1	1	1	1	18	4	6	2	6	8	6	4	1	34	11
4	2	1	1	2	11	11	4	4	18	1	22	6	4	1
1	1	10	8	32	11	4	11	4	44	14	24	4	4	1
2	2	12	2	1	22	8	6	6	23	6	4	8	4	11
1	1	28	14	8	2	10	10	8	18	14	11	4	16	38
1	6	2	2	2	6	1	8	4	40	1	6	1	1	1
11	4	52	8	22	76	56	28	24	12	22	30	18	56	50
1	1	1	4	2	6	6	1	1	8	4	8	14	4	1
8	1	32	2	1	50	40	36	1	40	14	14	10	22	56
38	8	6	50	42	14	1	1	1	1	12	1	1	4	2
1	1	12	1	2	1	1	1	1	40	1	22	4	1	28
1	6	2	24	8	11	4	8	1	23	8	4	11	6	23
78	10	16	40	50	14	36	18	16	2	14	46	11	16	16
6	10	28	18	26	22	16	14	20	44	11	26	12	4	46
2	1	2	10	1	6	16	14	12	18	4	1	1	6	4
2	10	28	8	2	12	16	6	16	34	14	22	20	46	6
1	1	2	1	12	1	1	1	1	8	11	18	2	2	16
1	6	16	1	1	8	11	11	10	18	8	16	2	8	23
20	1	1	14	18	40	32	24	14	13	62	68	24	11	30
10	1	1	20	18	11	20	6	10	8	50	76	56	64	74

Table A-9 (continued)
Black Male (continued)

Grade 3					Grade 4					Grade 5				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
68	18	12	60	68	28	23	20	66	60	30	18	34	52	62
16	2	22	18	32	8	10	23	24	50	11	6	34	22	6
1	1	16	1	1	6	4	4	1	1	4	14	10	16	2
8	1	22	40	8	12	2	1	10	2	6	11	1	2	11
20	1	1	1	4	12	8	4	8	34	18	11	1	4	12
96	82	78	68	76	88	28	14	6	50	82	32	60	28	62
16	4	2	8	36	11	10	1	6	1	26	10	6	11	4
10	10	12	2	1	1	8	4	4	8	11	26	1	2	23
1	1	1	1	2	11	4	1	8	18	10	16	1	6	10
20	4	1	44	64	6	1	10	40	12	18	6	6	30	22
20	2	1	24	60	11	4	11	8	12	18	2	8	16	28
4	1	4	1	2	14	6	4	1	1	10	8	2	2	1
38	14	22	9	22	28	14	34	2	18	32	18	11	1	50
18	6	28	4	14	22	1	2	20	12	22	24	8	22	16
50	66	60	42	28	68	64	23	24	50	40	24	32	23	18
1	1	1	8	1	8	4	10	8	8	6	8	2	16	16
11	18	24	8	18	32	16	6	8	34	22	20	10	10	20
4	11	24	8	38	1	11	10	24	44	1	10	10	40	38
16	1	4	1	1	4	1	14	20	2	8	18	4	11	23
1	1	3	1	2	6	11	1	4	1	1	1	1	8	6
4	8	1	1	6	8	11	1	2	8	6	4	8	22	23
1	1	28	6	12	2	4	1	4	1	4	18	4	40	38
2	1	10	1	2	1	1	1	1	1	1	1	1	4	23
1	1	1	18	4	6	10	6	4	18	4	4	2	8	23
1	1	2	1	1	1	2	1	10	1	4	1	1	2	50
2	1	28	12	12	2	1	12	24	18	6	1	4	6	38
50	58	36	2	26	24	40	40	34	18	40	42	38	34	38
1	1	16	1	10	1	2	12	1	1	6	4	8	1	2
35	50	12	1	12	32	11	4	20	34	26	38	12	34	26

Table A-9 (continued)
Black Male (continued)

<u>Grade 3</u>					<u>Grade 4</u>					<u>Grade 5</u>				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
16	2	1	1	22	1	4	1	2	1	6	14	1	8	11
23	4	1	8	42	44	34	4	20	8	36	16	4	22	16
4	11	14	10	6	11	30	4	12	2	11	44	8	10	4
20	26	22	20	32	24	40	8	12	34	22	46	24	14	30
56	26	32	24	18	58	46	60	40	92	54	52	56	38	42
2	6	28	32	12	1	11	11	2	8	11	16	6	11	23
16	11	1	10	42	22	2	1	12	8	11	6	1	8	46
7	4	1	4	18	32	8	8	4	12	26	22	4	16	23
2	1	2	4	2	4	20	4	4	4	8	11	2	8	2
8	1	4	1	14	18	20	4	4	4	11	11	8	11	30
1	1	1	7	1	14	6	1	4	2	14	11	6	8	16
26	1	12	8	1	22	14	4	6	23	14	10	11	8	4
2	1	1	1	1	18	14	4	2	8	1	11	4	2	46
2	1	1	1	2	18	23	1	6	12	1	8	1	12	16
11	2	2	1	2	1	1	1	10	12	4	10	2	8	38
26	26	32	40	22	4	23	14	1	8	11	22	4	8	38

Table A-9 (continued)

Black Female

<u>Grade 3</u>					<u>Grade 4</u>					<u>Grade 5</u>				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
16	6	12	18	1	4	10	11	4	12	6	38	4	28	11
6	1	12	2	18	6	26	6	24	2	4	4	1	22	4
50	42	42	36	50	44	26	64	50	50	58	22	36	8	38
1	1	6	14	4	24	6	1	2	18	6	8	2	11	1
1	1	4	2	4	2	1	8	10	12	2	16	11	6	11
8	23	28	14	10	18	23	1	4	23	4	32	2	6	4
23	11	22	32	10	12	34	42	56	8	8	58	11	4	23
3	38	38	84	58	44	70	80	56	86	70	66	64	56	90
11	2	12	14	18	4	11	14	1	18	4	26	1	1	38
8	11	4	10	4	36	20	23	30	8	4	4	8	40	11
1	1	1	6	4	2	1	1	6	4	8	4	1	1	38
8	10	22	18	12	12	10	10	16	8	18	4	6	46	62
1	6	1	10	1	24	1	1	4	18	2	1	1	11	6
23	10	22	8	1	18	4	11	6	18	6	10	11	2	11
6	1	22	18	4	1	1	1	1	1	1	26	1	6	6
2	18	16	10	12	44	14	11	34	40	32	34	6	11	11
26	2	10	24	2	6	26	6	20	12	4	34	14	8	30
8	1	1	2	1	2	4	2	1	1	1	4	2	4	2
23	8	14	6	8	12	20	2	24	4	4	4	16	16	11
2	2	1	1	1	8	4	1	1	50	14	6	18	22	16
16	8	22	24	42	11	23	48	46	74	6	32	20	50	30
22	32	42	51	22	24	28	50	56	74	14	66	28	86	68
3	1	2	2	1	18	10	14	10	2	32	4	26	4	16
20	6	16	32	42	12	14	6	10	23	6	8	6	1	23
16	18	16	20	30	6	20	14	40	44	6	4	14	70	50
1	1	1	1	1	22	2	1	1	2	1	2	1	4	1
32	26	2	36	42	22	36	42	62	40	26	32	46	8	30
6	1	4	14	2	14	30	11	12	40	18	10	2	1	4
16	2	6	2	4	14	16	8	1	23	18	11	30	6	6

Table A-9 (continued)
Black Female (continued)

<u>Grade 3</u>					<u>Grade 4</u>					<u>Grade 5</u>				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
32	20	16	24	36	24	28	12	46	50	30	14	58	28	56
4	1	1	14	2	24	1	1	2	1	4	14	1	11	23
11	32	28	76	12	11	23	32	56	44	70	32	50	22	62
1	1	1	18	2	12	11	1	34	8	8	14	1	8	46
8	78	12	24	18	12	50	14	20	40	6	30	22	6	56
50	36	32	10	30	58	58	89	72	34	50	66	56	40	30
1	6	2	1	1	14	14	6	1	1	11	8	2	1	16
10	1	4	2	4	12	8	14	10	23	4	11	4	28	16
1	1	12	8	1	12	11	1	8	18	32	26	38	46	26
1	1	2	18	4	54	78	10	30	82	6	8	4	4	11
1	6	1	1	2	2	2	2	1	12	8	14	1	2	23
1	1	1	1	8	14	14	1	8	34	14	4	4	2	6
8	16	2	6	1	22	28	4	23	4	36	30	11	1	46
8	1	28	8	1	28	10	10	10	18	6	24	4	2	30
16	23	32	5	18	22	50	26	12	12	45	47	27	38	19
11	1	1	2	1	12	1	8	4	34	2	4	2	6	4
4	8	12	14	8	4	16	2	6	23	22	24	12	8	50
2	1	1	2	1	22	10	2	2	1	14	8	1	16	6
10	4	6	32	2	36	34	44	56	40	32	33	36	46	23
4	8	12	18	18	1	16	6	4	34	6	18	1	6	11
20	23	4	10	10	32	16	10	1	74	14	40	18	6	6
1	1	1	1	1	6	10	1	2	18	4	4	1	8	11
26	26	14	14	12	44	11	10	8	34	6	38	11	2	23
44	70	70	80	82	80	64	84	20	60	50	64	64	16	46
6	2	4	10	22	4	2	1	1	4	4	6	1	11	23
26	8	6	20	30	32	42	23	6	1	30	8	14	22	16
6	6	12	14	12	14	16	14	12	60	74	50	52	70	70
6	4	2	2	10	6	4	12	12	8	6	18	1	16	6
1	4	10	20	10	11	6	40	4	8	4	11	14	8	16

Table A-9 (continued)
Black Female (continued)

<u>Grade 3</u>					<u>Grade 4</u>					<u>Grade 5</u>				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
1	2	2	10	30	22	4	6	24	2	18	4	1	11	2
2	1	38	14	2	1	10	2	12	2	6	18	8	8	23
10	14	32	10	18	22	28	42	6	12	11	16	20	6	23
26	32	52	18	26	12	16	8	1	18	18	22	20	16	20
23	26	2	10	10	36	40	23	12	44	26	6	2	8	23
32	32	32	60	30	18	40	50	20	60	18	40	50	56	46
10	10	14	6	4	6	6	1	30	2	4	22	11	34	4
1	1	12	1	2	1	1	1	1	8	1	1	1	1	11
84	96	94	20	42	68	50	80	1	40	88	74	82	28	46
6	6	1	10	4	8	6	4	6	23	18	6	4	46	11
68	50	38	68	50	42	40	28	22	50	50	30	36	28	56
20	1	6	8	10	11	4	8	6	2	1	11	6	16	11
32	6	1	32	12	12	14	2	6	23	14	14	1	28	16
8	6	2	32	12	6	16	14	4	8	6	11	4	22	6
20	8	24	10	8	24	23	4	12	12	20	28	12	14	14
23	14	28	84	10	12	20	20	30	40	6	22	14	22	50
88	20	1	6	1	12	26	10	8	23	26	22	22	46	30
96	58	64	68	60	50	56	76	40	60	60	52	62	52	50
88	11	12	40	72	40	26	36	34	12	62	18	34	42	52
23	8	12	14	12	2	10	1	1	23	6	8	1	2	16
62	2	1	24	10	1	4	1	34	2	14	2	6	40	12
4	2	2	4	2	28	8	6	2	18	11	34	14	6	16
1	6	54	8	4	11	26	12	20	23	12	40	26	14	22
36	14	30	22	14	32	28	48	2	23	44	36	52	18	22
26	14	4	14	4	12	14	4	10	23	22	18	12	12	32
31	6	16	10	10	32	26	14	16	23	11	10	14	8	2
10	1	16	1	4	14	23	6	20	12	22	16	4	18	14
1	1	2	1	4	1	6	6	8	34	1	11	4	8	23
23	18	24	18	10	11	16	14	6	18	2	11	32	28	6

Table A-9 (continued)
Black Female (continued)

<u>Grade 3</u>					<u>Grade 4</u>					<u>Grade 5</u>				
WM	PM	L	AM	AN	WM	PM	L	AM	AN	WM	PM	L	AM	AN
8	4	16	14	26	28	11	14	6	12	8	11	14	6	46
23	4	28	36	10	11	16	18	24	12	8	6	14	16	6
1	6	16	36	22	1	30	11	20	34	6	32	20	8	56
16	1	4	20	12	12	14	11	16	18	14	26	14	50	50
26	20	36	8	18	18	16	10	1	8	4	22	11	11	16
3	2	2	11	3	18	34	28	20	50	11	24	6	8	50
1	1	16	15	2	2	2	2	2	40	4	1	1	8	16
1	12	2	1	3	1	1	4	6	40	30	4	1	6	4
50	10	1	36	30	8	16	12	16	40	4	18	11	11	6
2	6	1	4	8	4	6	4	12	12	4	11	4	23	14
78	74	38	24	86	94	74	78	66	82	62	76	42	8	56
1	6	16	20	18	24	23	36	84	18	2	40	11	6	30
62	4	2	28	30	18	16	14	24	8	36	16	8	46	30
16	12	2	8	50	2	1	1	24	32	8	12	1	12	6
10	2	42	18	22	12	20	1	4	4	8	16	4	4	11
1	1	16	14	1	6	1	1	2	12	6	4	1	2	1
84	62	16	68	72	4	11	6	12	23	6	4	4	12	11
38	36	2	60	94	54	68	48	66	70	36	50	40	22	56
1	4	22	4	1	2	8	8	34	1	1	2	4	26	4

Table A-10. Number of Subjects per Quartile

Subtest	Group	QUARTILE			
		1	2+3	4	N
Para. Mean	Black Male	89	12	1	102
	Black Female	88	16	2	106
	White Male	58	38	14	110
	White Female	34	62	15	111
Arith. Comp.	Black Male	87	14	1	102
	Black Female	84	18	4	106
	White Male	44	45	21	110
	White Female	29	51	31	111

Table A-11. Z-Score Means, Grade 3 Quartile 1 and 4 Subjects

Subtest	Group	GRADE			
		3	4	5	N
Para. Mean	WM Q1	-1.6	-1.2	-1.1	58
	WM Q4	1.4	1.3	1.1	14
	WF Q1	-1.4	-1.0	-1.1	34
	WF Q4	1.0	.6	.8	15
	BM	-2.0	-1.4	-1.3	89
	BF	-1.7	-1.2	-1.1	88
Arith. Comp.	WM Q1	-1.2	-1.5	-1.2	44
	WM Q4	1.5	.0	- .1	21
	WF Q1	-1.2	-1.3	-1.2	29
	WF Q4	1.3	- .1	- .2	31
	BM	-1.7	-1.6	-1.3	87
	BF	-1.4	-1.4	-1.2	84

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BIOGRAPHICAL SKETCH

Dora Catherine Baltzell was born September 8, 1943, in Auburn, Alabama and, at the age of three, moved with her family to Prattville, Alabama. She attended elementary school at Prattville Elementary and high school at Autauga County High in Prattville, receiving her high school diploma in 1961. She subsequently attended the University of Alabama and graduated in 1965, receiving a Bachelor of Arts with a major in American Studies Honors and minors in political science, literature, and history.

After receiving her BA, she moved to Huntsville, Alabama where she was employed as a technical writer and editor in the aerospace industry and as a sixth grade teacher. In 1967 she moved to Gainesville, Florida where she taught English and social studies in junior high school.

In March, 1968, she enrolled for graduate studies in the College of Education at the University of Florida. In July, 1972, she moved to Jacksonville, Florida, taking a position in research and program evaluation with the Duval County School Board. In June, 1973, she received her Master of Education degree with a major in educational psychology and a minor in psychology. In January, 1975,

Ms. Baltzell was appointed to the position of Supervisor of ESEA Title I Evaluation for Duval County School Board. She served as Supervisor until November, 1975, when she accepted her present position as Senior Analyst with Abt Associates of Cambridge, Massachusetts.

Ms. Baltzell is a member of Phi Delta Kappa, the American Educational Research Association, Women Educators, and the New England Educational Research Organization.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



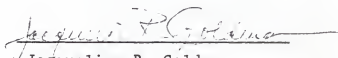
Wilson H. Guertin, Chairman
Professor of Foundations of
Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



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Associate Professor of Foundations
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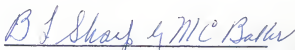
I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



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March, 1976



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